Science, Art, and Music

Frank Dodd (Tony) Smith, Jr. - 2019

Abstract

In my view: Science = Art = Music:

Science is explained by a Theory of Everything (TOE) using Real Clifford Algebra Cl(16)

The Pinnacle of Human Art is Marcel Duchamp's Large Glass which (when combined with its Mirror image) corresponds in detail with Cl(16) Physics TOE

The Pinnacle of Human Music is Beethoven's Grosse Fugue which corresponds in detail with Cl(16) TOE

Cl(16) emerged from a Quantum Fluctuation in a Void in our Parent Universe
by **David Finkelstein's Clifford Iteration Process:**

Cl(Void) = Clifford Algebra of Void = 0
Cl(0) = 2^0 dimensions = 1
Cl(1) = 2^1 = 2
Cl(2) = 2^2 = 4
Cl(4) = 2^4 = 16
Cl(16) = 2^16 = 65,536 = tensor product Cl(8)xCl(8) = 256x256

Cl(16) has 16 Vectors = Lie Ball = Spin(10) / Spin(8) x U(1)
Cl(16) has 120 BiVectors = D8 subalagebra of E8
Cl(16) has 128 half-Spinors (1 0-Vector + 126 8-Vectors + 1 16-Vector)
120+128 = 248 = E8
Cl(16) has 560 TriVectors = 10 copies of Fr3(O)
56-dim Fr3(O) has 2 copies of 27-dim J3(O)
The other 65,536-16-120-128-560 = 64,712 elements of Cl(16) are available
to carry information in processes such as Quantum Consciousness.

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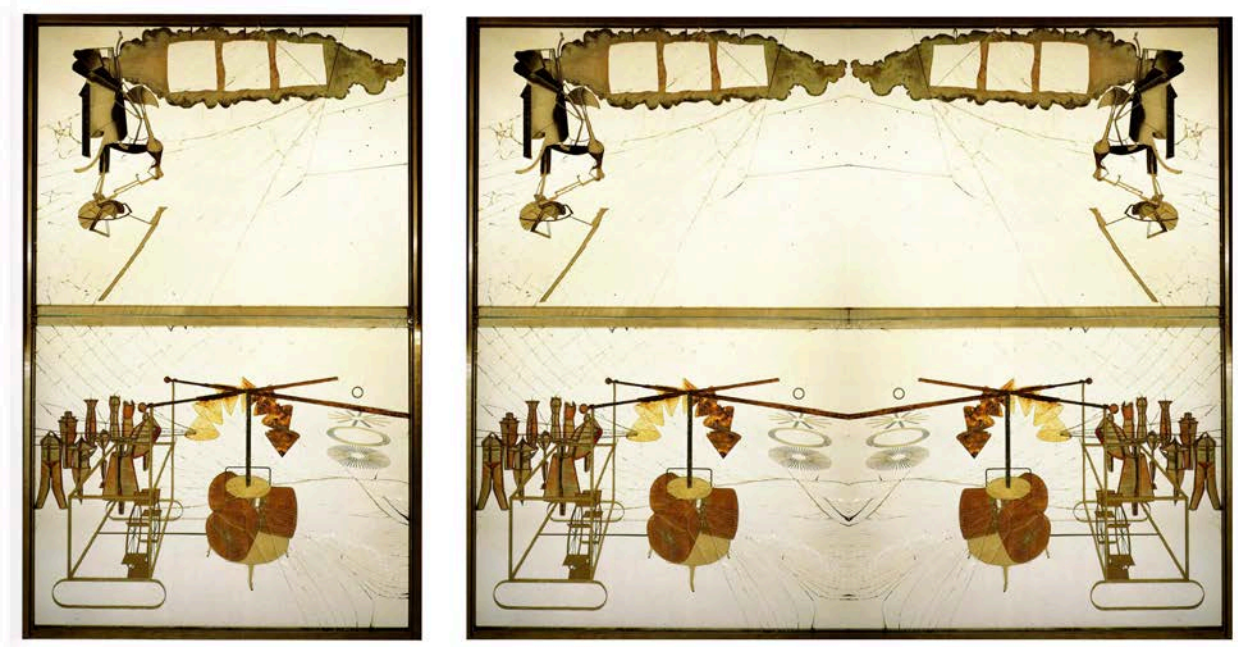
Large Glass + Mirror represents Cl(16) Physics

Marcel Duchamp's Large Glass, when combined with its Mirror Image - LG+M -

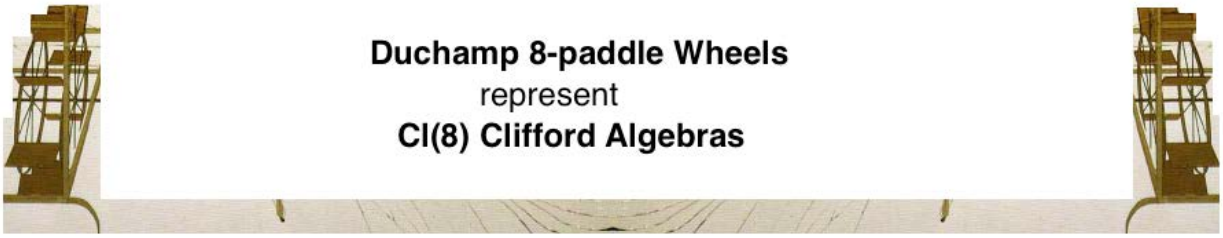


seems to contain the basic elements of a Theory of Everything (TOE)
based on Real Clifford Algebra Cl(16) (viXra 1809.01670 and 1810.0365).
Cl(16) emerged from a Quantum Fluctuation in a Void in our Parent Universe
by David Finkelstein's Clifford Iteration Process

Cl(Void) = Clifford Algebra of Void = 0
Cl(0) = 2^0 dimensions = 1
Cl(1) = 2^1 = 2
Cl(2) = 2^2 = 4
Cl(4) = 2^4 = 16
Cl(16) = 2^16 = 65,536

which stops at Cl(16) because, by 8-Periodicity of Real Clifford Algebras,
Cl(16) = tensor product Cl(8) x Cl(8)

LG+M represents the two 256-dim Cl(8) by two 8-paddle Wheels



Each Cl(8) contains 28-dim D4 Lie Algebra as its BiVectors.

LGL+M = Cl(16) Structure Sequence

with descriptive annotation
and some Llull X-Wheels and some Aschheim E8 Root Vectors

BiVectors D4 and D4

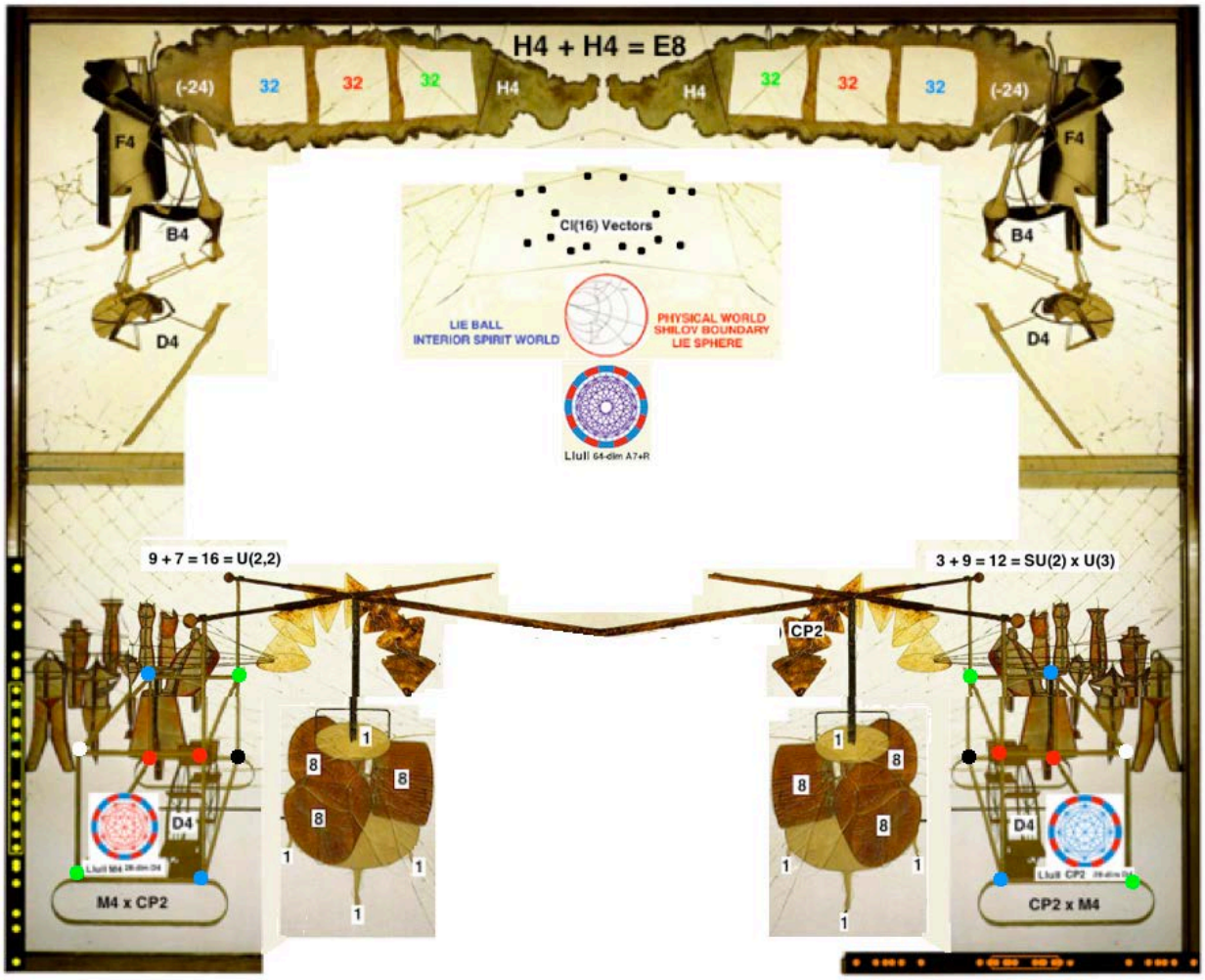
Add: B4 Vectors and F4 Spinors to get H4 and H4 + H4 = E8:

BiVectors + half-Spinors = E8:

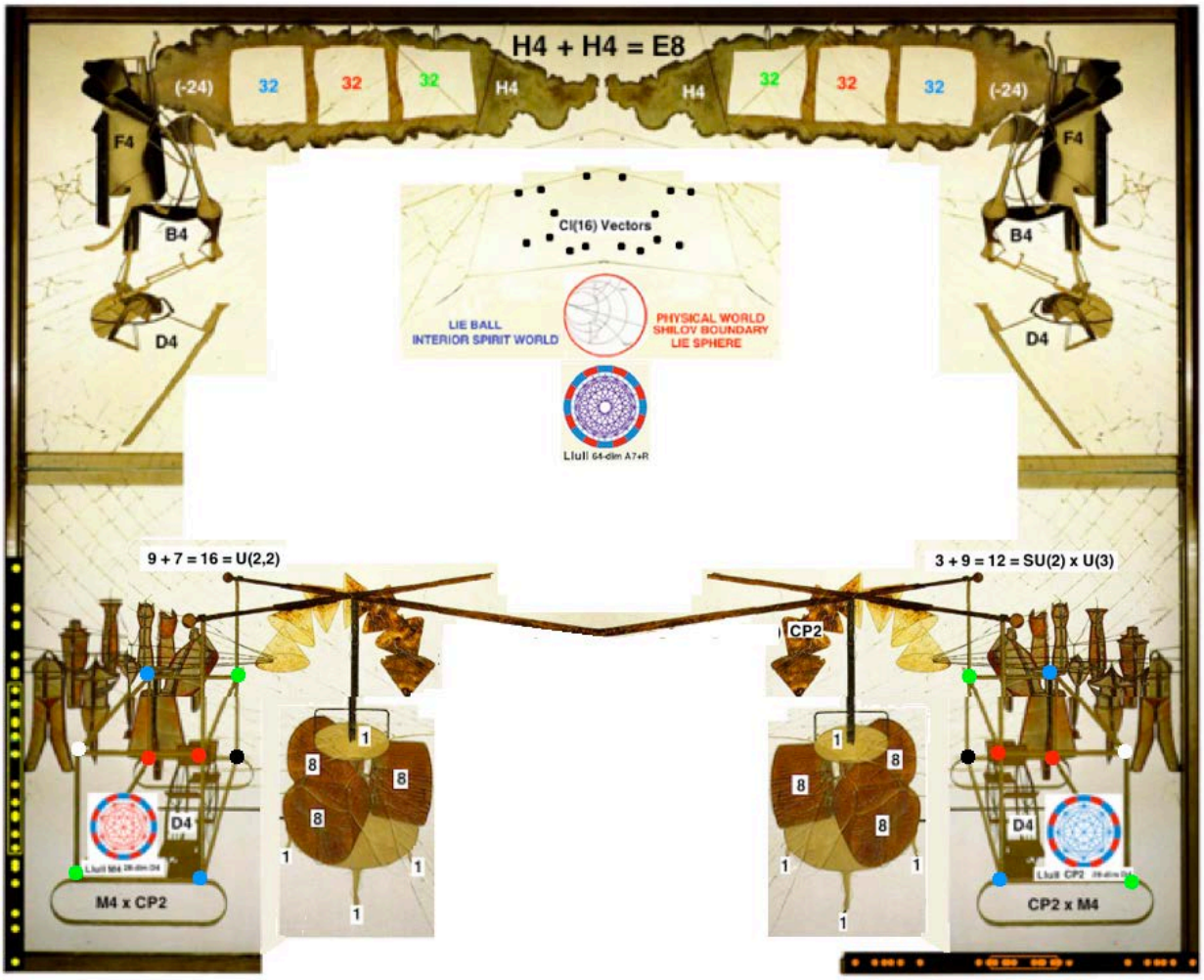
Add 16 Vectors = Lie Ball Spin(10) / Spin(8) x U(1):

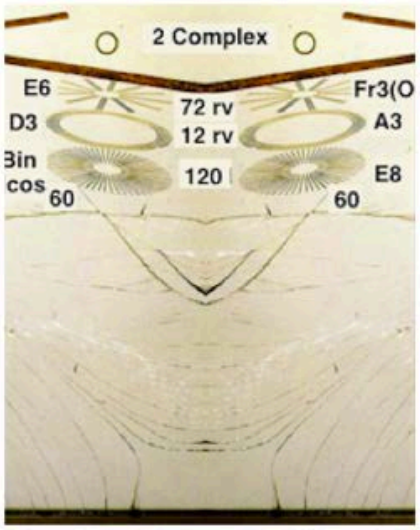

H4 + H4 = E8
(-24)
32
32
32
H4
H4
32
32
32
(-24)
F4
B4
D4
Cl(16) Vectors
LIE BALL
INTERIOR SPIRIT WORLD
PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE
Liull 64-dim A7+R
F4
B4
D4
9 + 7 = 16 = U(2,2)
3 + 9 = 12 = SU(2) x U(3)
CP2
D4
Liull M4 28-dim D4
M4 x CP2
D4
Liull CP2 28-dim D4
CP2 x M4

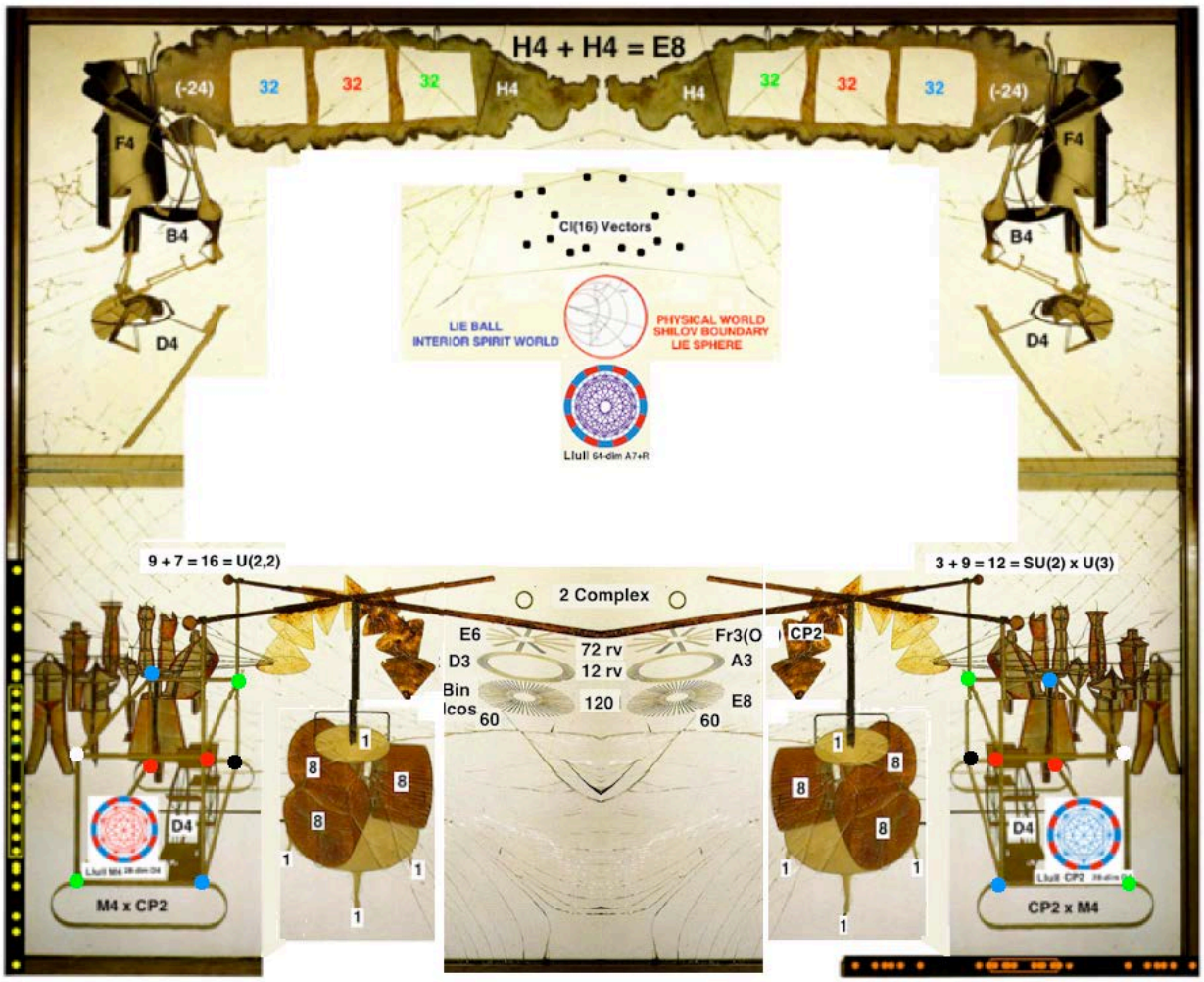
Add 560 TriVectors = 10 copies of 56-dim Fr3(O):



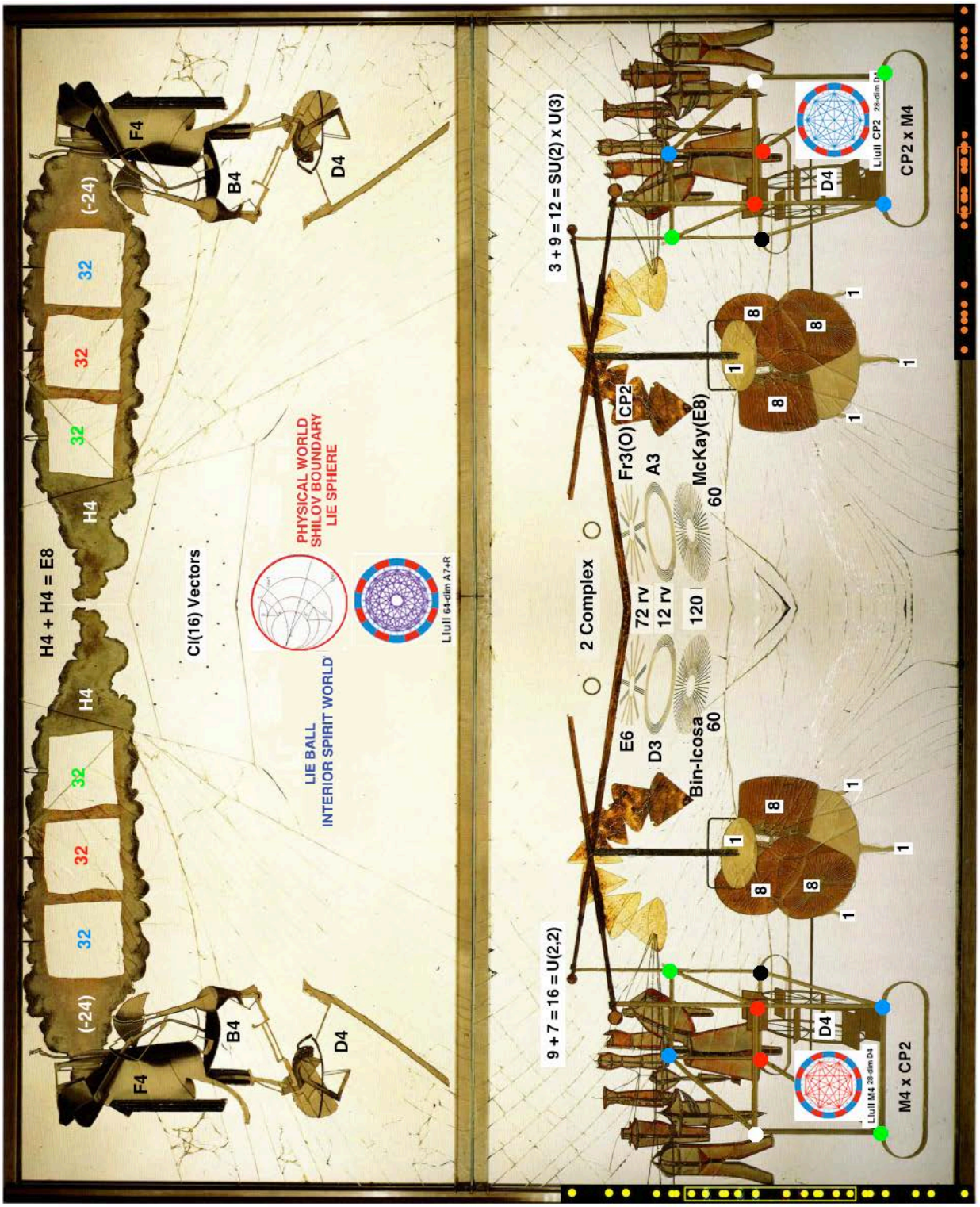
Add Conscious Smiling Spirit Being:



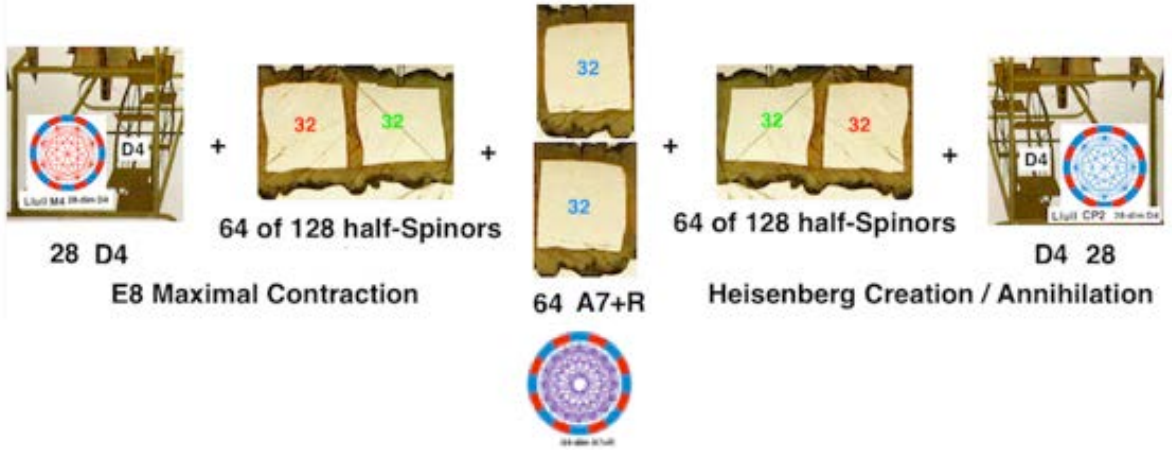



H4 + H4 = E8
(-24)
32
32
32
H4
H4
32
32
32
(-24)
F4
B4
D4
F4
B4
D4
Cl(16) Vectors
LIE BALL
INTERIOR SPIRIT WORLD
PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE
Llull 64-dim A7+R
9 + 7 = 16 = U(2,2)
3 + 9 = 12 = SU(2) x U(3)
2 Complex
E6
D3
Bin
Icos
60
72 rv
12 rv
120
Fr3(O
A3
E8
60
CP2
D4
M4 x CP2
CP2 x M4

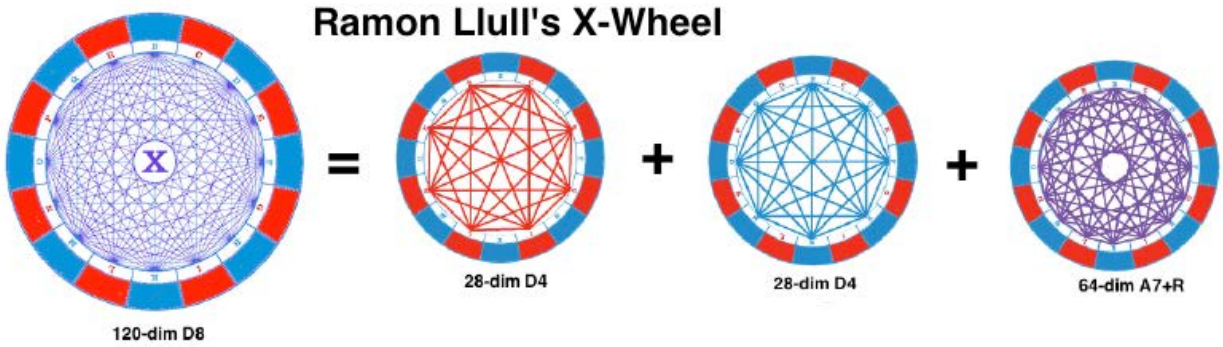
See Large Glass + Mirror
with Ramon Llull X-Wheels and some Aschheim Root Vectors:



David Finkelstein's Clifford Iteration Process uses
Quantum Creation / Annihilaton Operators of Particles and Spacetime
whose **Heisenberg Algebra is the Maximal Contraction of 248-dim E8 Lie Algebra**
contained in Cl(16) as its BiVectors and half-Spinors.
It is represented by the 2 paddle Wheels and the 3+3=6 Windows of LG+M



600 years before Duchamp, Ramon Llull represented D8 BiVector Lie Algebra of Cl(16)
by his X-wheel whose 120 lines break down into two sets of 28 lines for two D4 and
64 lines for A7+R that represent Creation / Annihilation Operators for 8-dim Spacetime.



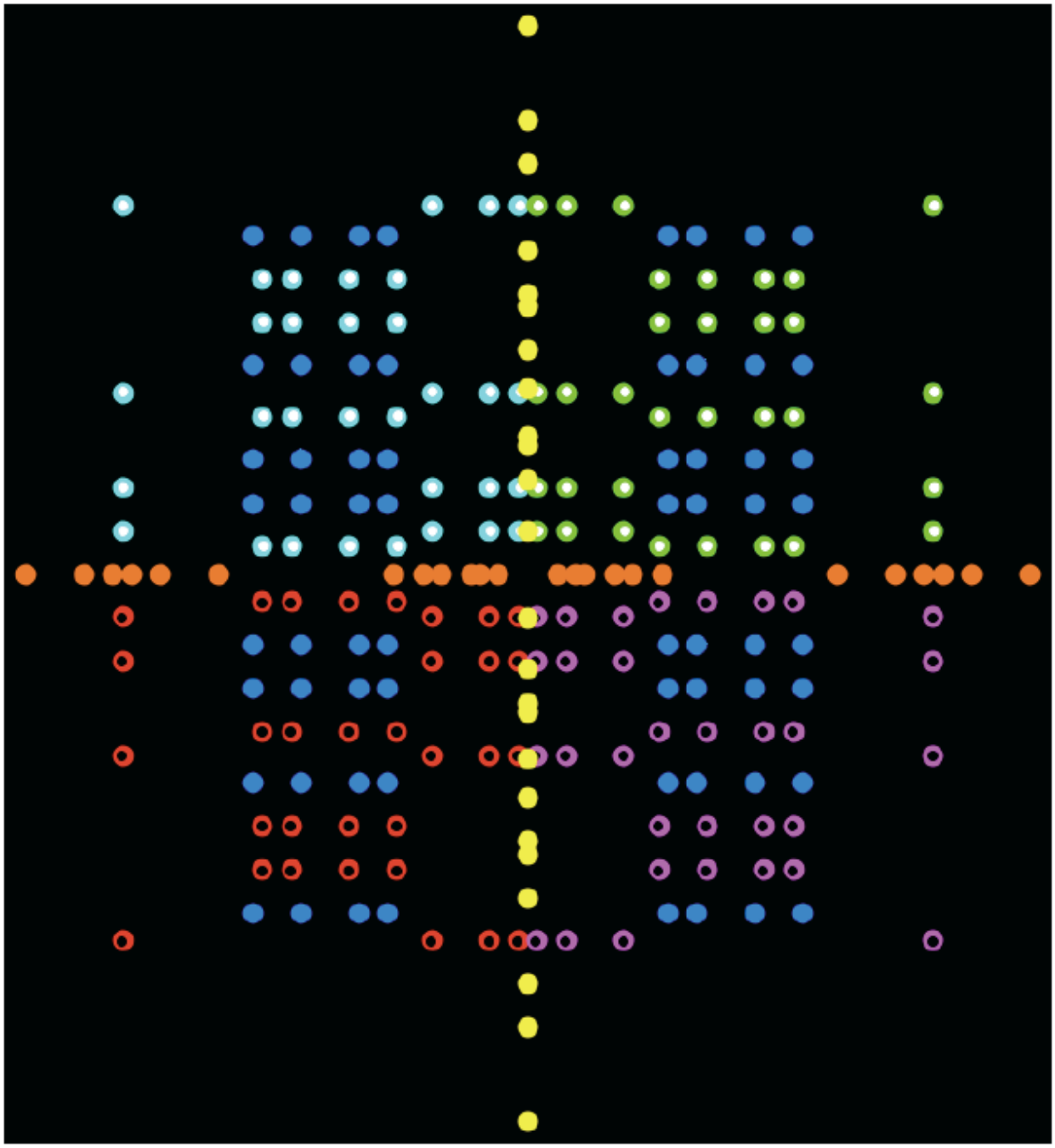
whose 8-dim Octonionic Vector Space has Quaternionic substructure
that is manifested at the End of Inflation as M4 x CP2 Kaluza-Klein
where M4 is 4-dim Physical Spacetime and CP2 = SU(3) / SU(2)xU(1)

The LG+M 8 paddle Wheel on the left has 28-dim D4 BiVectors with Conformal U(2,2)
subalgebra containing D3 = Spin(2,4) giving Gravity + Dark Energy
and acting on M4 of M4 x CP2.

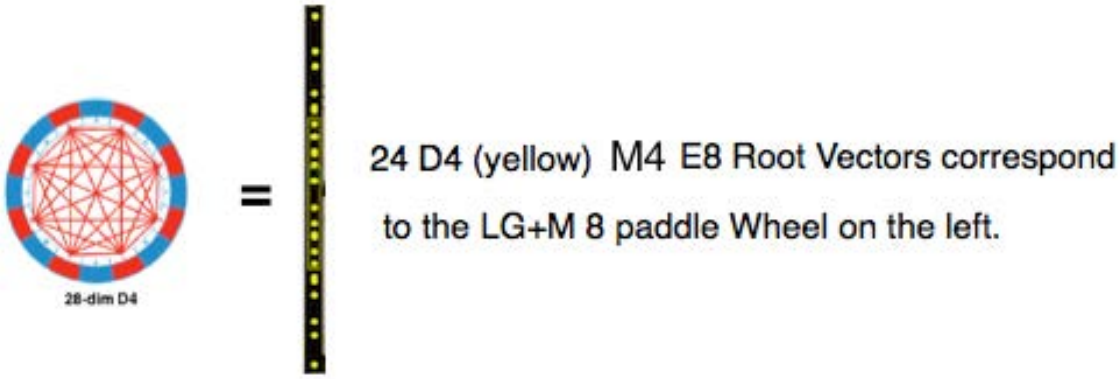
The LG+M 8 paddle Wheel on the right has 28-dim D4 BiVectors with A3 = SU(4)
subalgebra containing SU(3) giving the Standard Model and acting on CP2
of M4 x CP2. SU(2)xU(1) of the Standard Model come from CP2 = SU(3) / SU(2)xU(1).

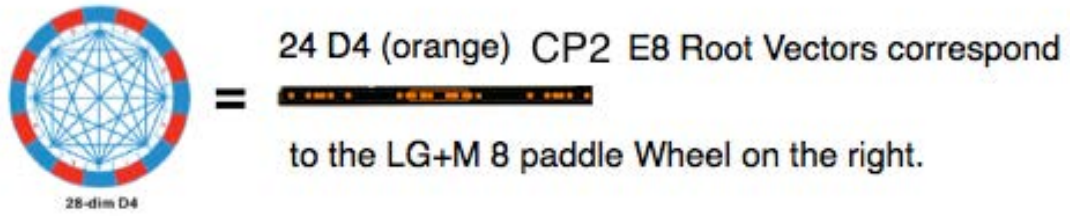
Not shown on Ramon Llull's X-Wheel are Creation / Annihilation Operators for
the 128 Cl(16) half-Spinors representing 8 components of the Fermion First Generation
8 Particles and 8 AntiParticles. They are among the 240 E8 Root Vectors that live in

the 8-dim E8 Root Vector Space that have been represented by Ray Aschheim in 2-dim:

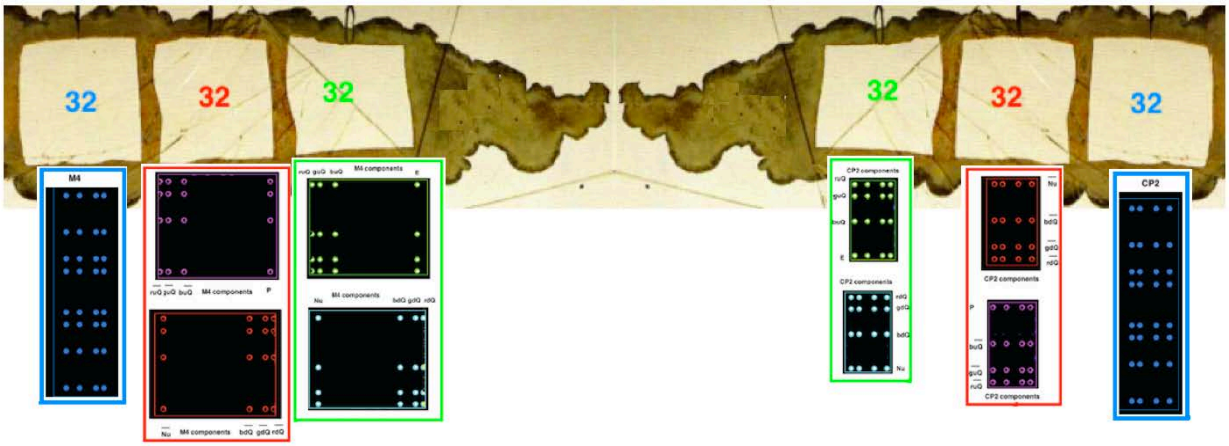


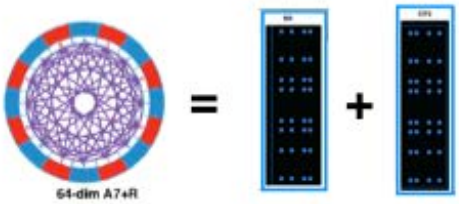
248-dim E8 = 120-dim Spin(16) D8 + 128-dim half-spinor of Spin(16) D8
240 E8 Root Vectors = 112 D8 Root Vectors + 128 D8 half-spinors
112 D8 Root Vectors = 24 D4 (orange) + 24 D4 (yellow) + 64 (blue)
128 D8 half-spinors = 128 elements of E8 / D8
Green and Cyan dots with white centers (32+32 = 64 dots) and
Red and Magenta dots with black centers (32+32 = 64 dots)
correspond to the 128 elements of E8 / D8.





The other 64 + 64 + 64 = 192 E8 Root Vectors correspond to the 6 Windows as:





Cl(16) 120 BiVectors + 128 half-Spinors = E8

Here is the part of LG+M representing how the two D4 grow into H4+H4 = E8:

The Left D4 of Gravity + Dark Energy contains 9+7=16-dim U(2,2)
The Right D4 of Standard Model contains 3+9=12-dim SU(3) x SU(2)xU(1)
with the SU(2)xU(1) coming from CP2 = SU(3) / SU(2)xU(1)

Each D4 grows into B4 (B4 / D4 = OP1)
Each B4 grows into F4 (F4 / B4 = OP2)
Each F4 grows into H4 (F4 root vectors = 24-cell + dual 24-cell
with dual 24-cell replaced by 96 Golden Ratio points
consistently placed on 96 edges of dual 24-cell)

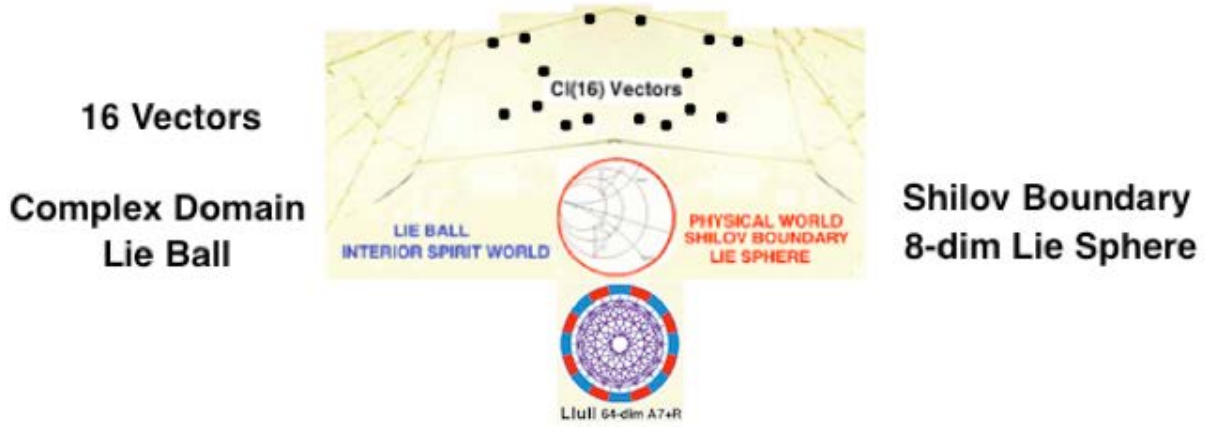
There are two ways to place the Golden Ratio Points,
one way for each of the two H4 emerging from the two D4.

96 Golden Ratio points are
64 of A7+R Unimodular Group of 8-dim Spacetime (32 for M4 and 32 for CP2)
64 = 8 components of 8 Fermion Particles (32 for M4 and 32 for CP2)
64 = 8 components of 8 Fermion AntiParticles (32 for M4 and 32 for CP2)
Finally, 120 + 120 root vectors of the two H4 = 240 root vectors of E8.

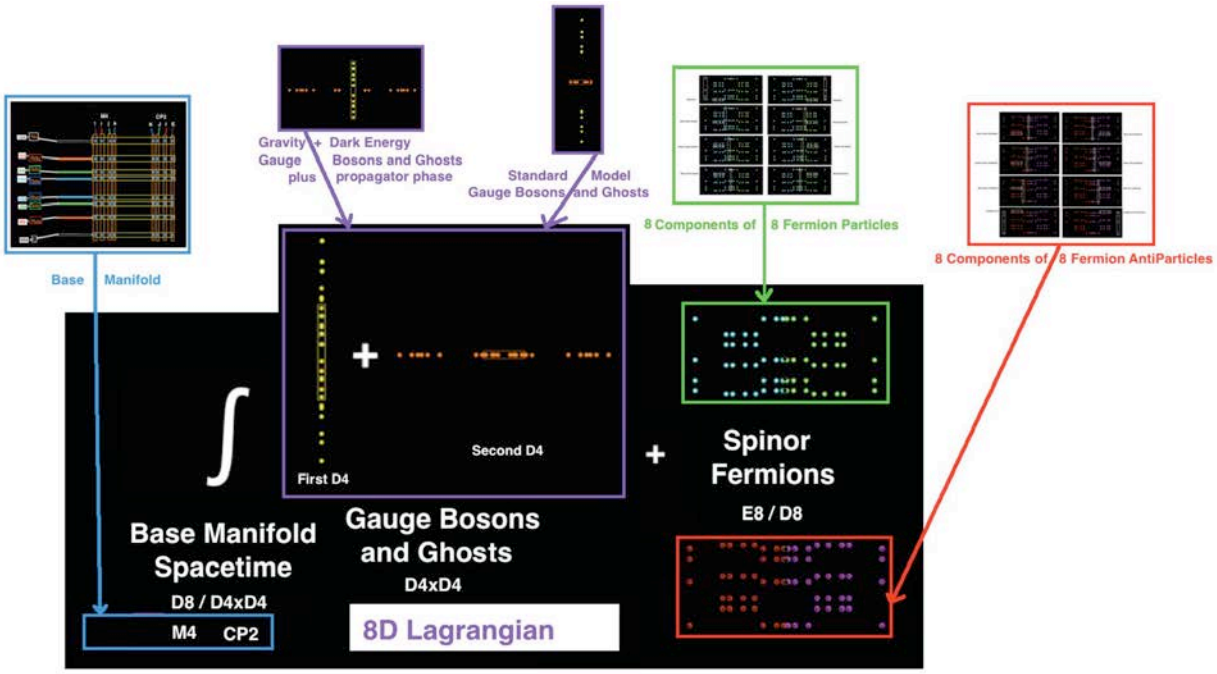
Cl(16) 16 Vectors = Lie Ball Spin(10) / Spin(8)xU(1)

Here is the part of LG+M representing the Vectors of Cl(16):

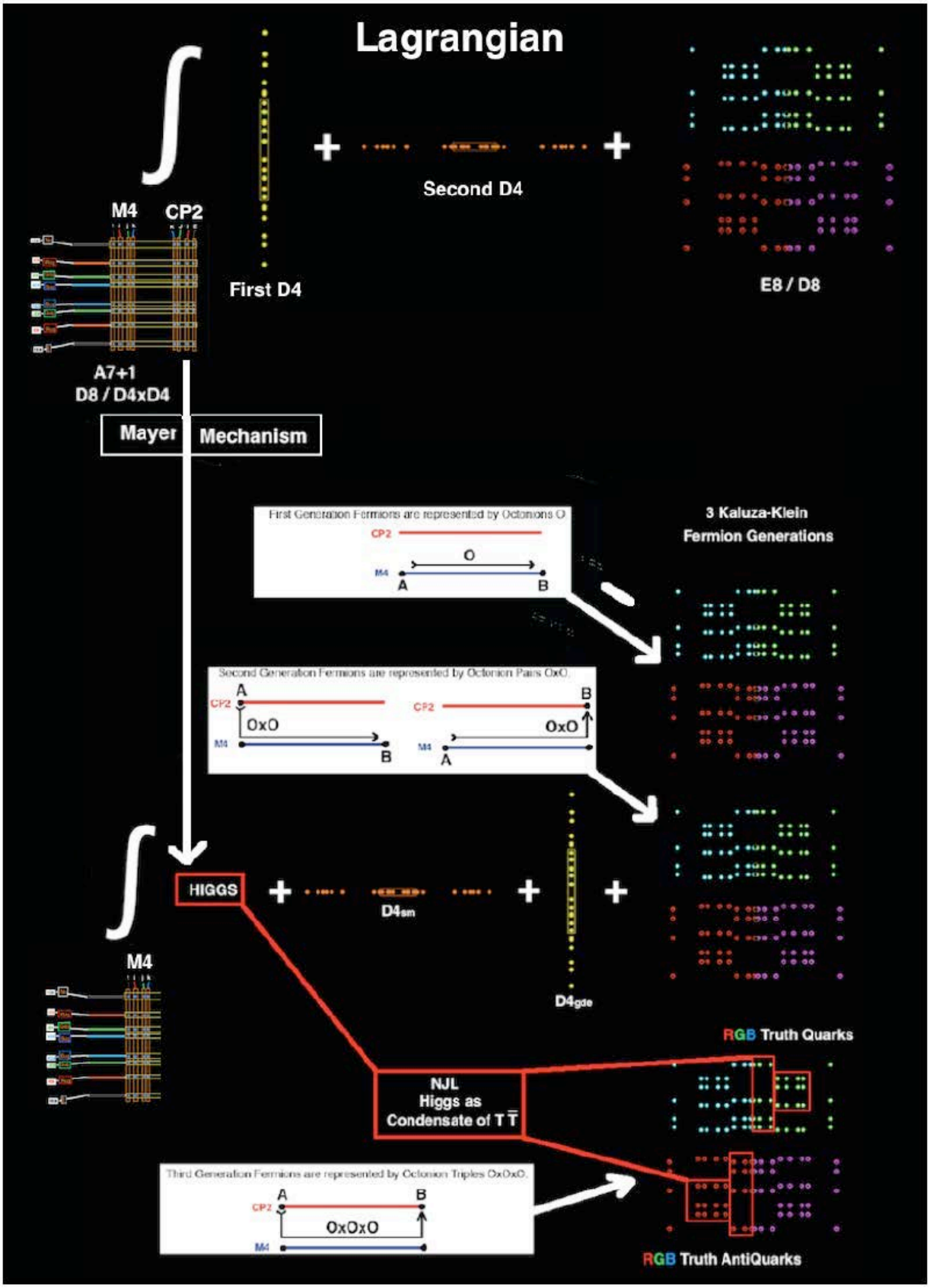
Cl(16) has 16 Vectors represented by Duchamp as small black dots



Cl(16) Vectors = Lie Ball Spin(10) / Spin(8)xU(1) Symmetric Space
with Bounded Complex Domain of Hua Type IV(8)
whose Lie Sphere Shilov Boundary is 8-dim Spacetime
with Unimodular Symmetry A7+R that is Base Manifold for
a Lagrangian based on E8 structure:

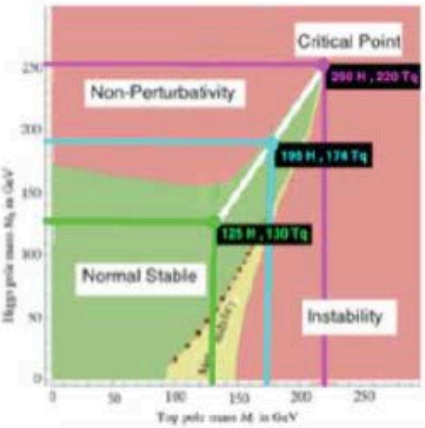


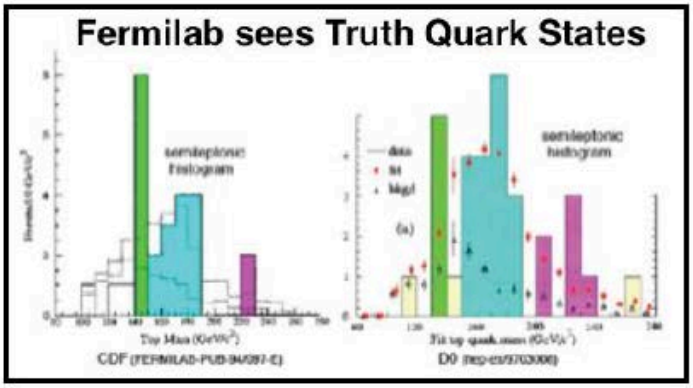
8-dim Octonionic Lagrangian reduces to 4+4-dim M4 x CP2 Kaluza-Klein
producing Higgs and Fermion Generations 2 and 3:

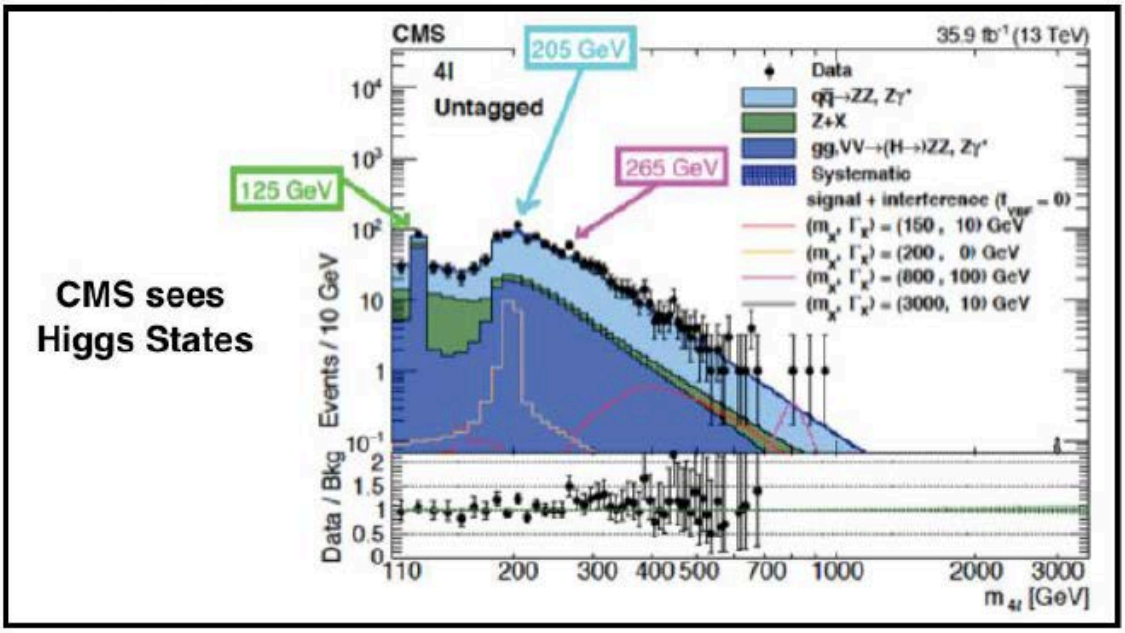

Lagrangian
Second D4
M4
CP2
First D4
E8 / D8
A7+1
D8 / D4xD4
Mayer
Mechanism
First Generation Fermions are represented by Octonions O
CP2
M4
O
A
B
3 Kaluza-Klein
Fermion Generations
Second Generation Fermions are represented by Octonion Pairs OxO
CP2
M4
OxO
OxO
HIGGS
D4sm
D4gde
M4
RGB Truth Quarks
NJL
Higgs as
Condensate of T T̄
Third Generation Fermions are represented by Octonion Triples OxOxO
CP2
M4
OxOxO
RGB Truth AntiQuarks

and a Nambu-Jona-Lasinio System of Higgs and Truth Quarks
that has Higgs as Truth Quark-AntiQuark Condensate and 3 mass states:

Higgs at 125 GeV and Truth Quark at 130 GeV
Higgs at 200 GeV and Truth Quark at 174 GeV
Higgs at 250 GeV and Truth Quark at 220 GeV

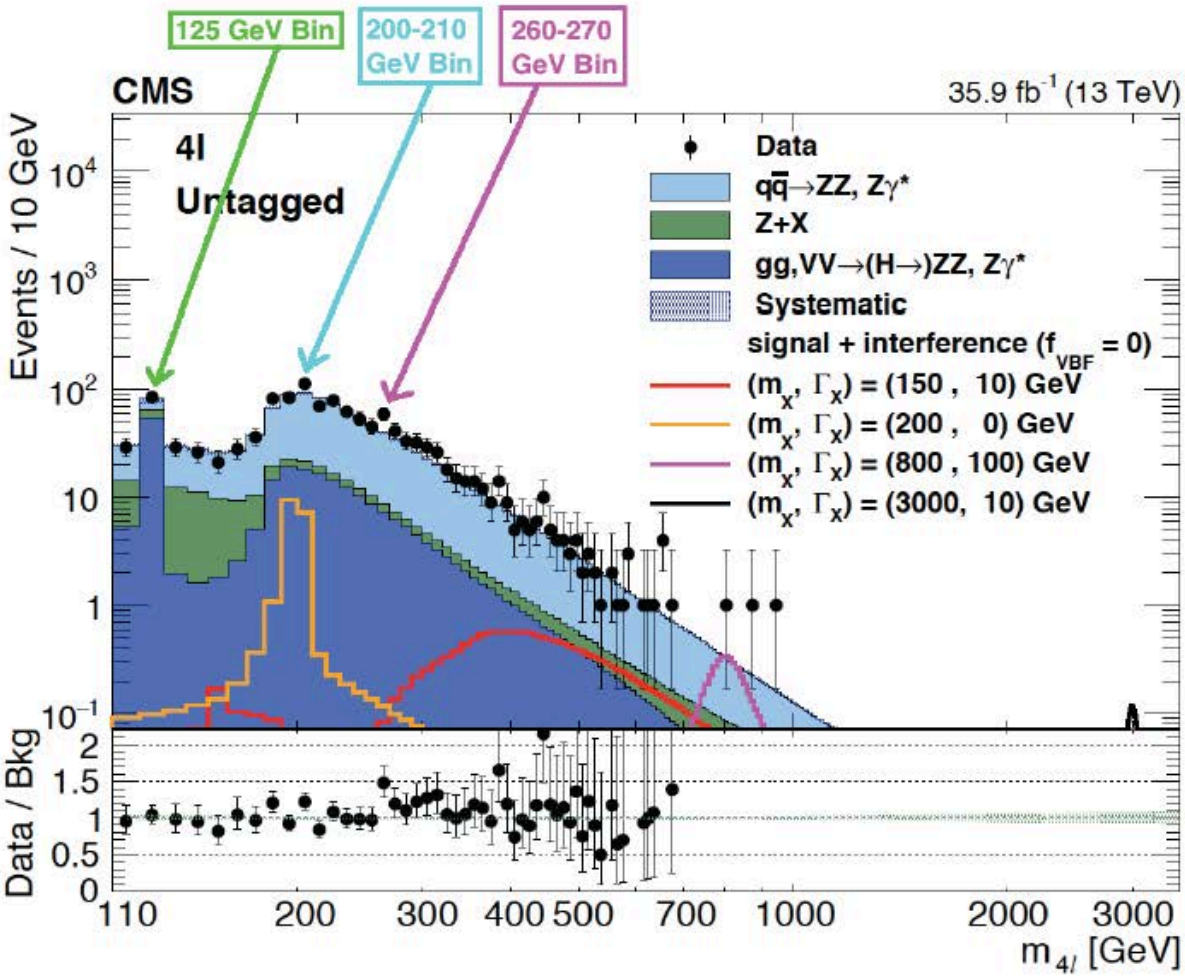




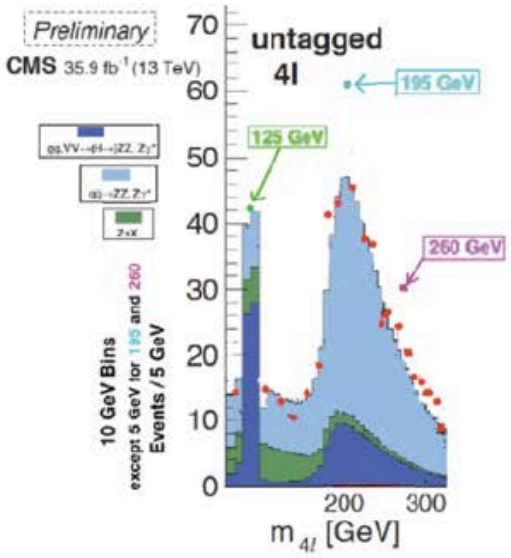


Here are more details about 3 Truth Quark and Higgs Mass States
being observed by Fermilab and the LHC:

The LHC with 35.9 fb-1 of data collected in 2016 saw
(arXiv 1804.01939):



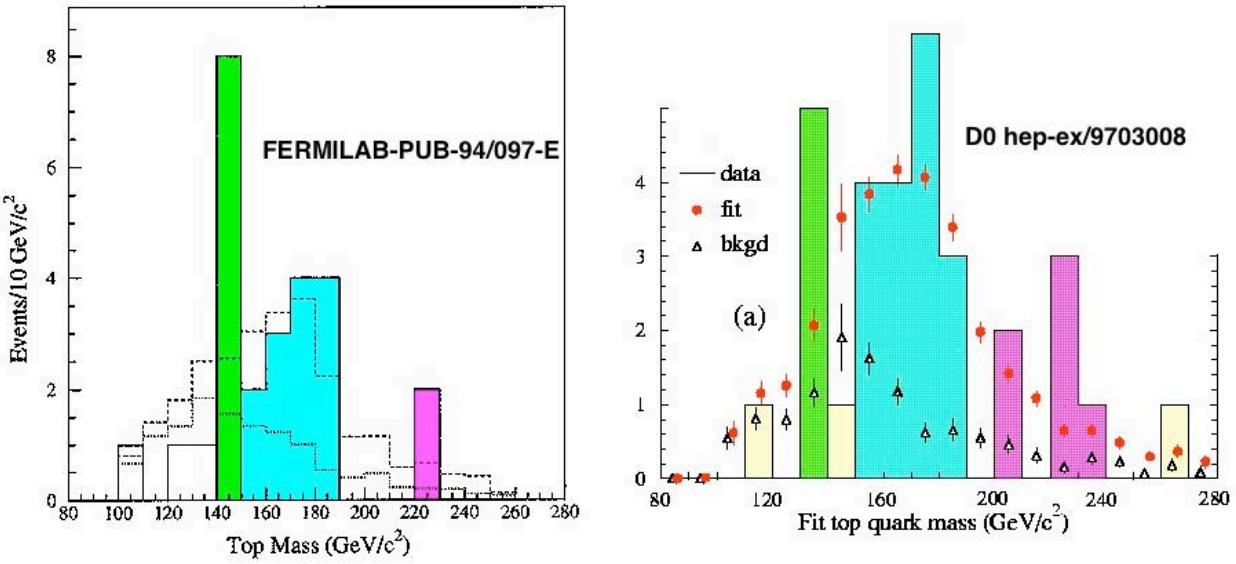
The log scale for event number used by CMS makes the Higgs peaks look small.
The peaks appear more realistic using a linear scale for event number:



I had hoped that Moriond 2019 would show a similar histogram for all of LHC data through Run 2 (about 150 fb-1) that would either continue to show (and therefore confirm) my two peaks or wash my two peaks out with the new 150 - 36 = 114 fb-1 of Run 2 data. I do not see any indication that CMS (or ATLAS) has done that analysis.

Therefore I suspect that LHC powers-that-be are more interested in suppressing my work than in evaluation that might confirm it even though confirmation might give the physics community a very useful way to advocate construction of future colliders such as FCC or even muon colliders.

The Official Consensus of Fermilab is that the low-mass green peaks of the CDF and D0 semi-leptonic histograms are only statistical fluctuations



Tommaso Dorigo: the significance of such similar green peaks being seen by both CDF and D0, consistent with my model prediction, is 4 -sigma.

Therefore I suspect that Fermilab powers-that-be are also more interested in suppressing my work than in evaluation that might confirm it even though confirmation of such a Nambu-Jona-Lasinio System might be useful in planning future experimental facilities.

Symmetric Spaces for the 4 Forces of Physics are:

S4 for Spin(2,3) Gravity
CP2 for SU(3) Color Force
S2 x S2 for SU(2) Weak Force
S1 x S1 x S1 x S1 for U(1) Electromagnetism

Complex Domain - Shilov Boundary structures give Bergman Kernels as Green's Function Propagators of Schwinger Source Particles
and allow
(using techniques of Armand Wyler) calculation of Force Strength and Particle Mass with results that show a realistic TOE:

Gauge Bosons "see" M4 Physical spacetime as the Symmetric Space of their symmetry so that their part of the Physical Lagrangian is

$$\int \text{Gauge Boson Term}$$

Symmetric Space

The Schwinger Sources for Gauge bosons are the Complex Bounded Domains with Shilov Boundaries for the Gauge Symmetry. Force Strength is given by the SpaceTime Symmetric Space volume and the Schwinger Source volume.

Fermion masses are calculated as a product of four factors:

V(Qfermion) x N(Graviton) x N(octonion) x Sym

V(Qfermion) is the vo lume of the part of the half-spinor fermion particle manifold S^7 x RP^1 related to the fermion particle by boson interactions.
N(Graviton) is the number of types of graviton related to the fermion.
N(octonion) is an octonion number factor relating up-type quark masses to down-type quark masses in each generation.
Sym is an internal symmetry factor, relating 2nd and 3rd generation massive leptons to first generation fermions.

Details of calculations and results (viXra 1804.0121) are:

Results of E8 Physics Calculations:

Here is a summary of E8 Physics model calculation results. Since ratios are calculated, values for one particle mass and one force strength are assumed. Quark masses are constituent masses. Most of the calculations are tree-level, so more detailed calculations might be even closer to observations.

Fermions as Schwinger Sources have geometry of Complex Bounded Domains with Kerr-Newman Black Hole structure size about 10^(-24) cm.

(**for calculation details see viXra 1804.0121**)

Dark Energy : Dark Matter : Ordinary Matter = 0.75 : 0.21 : 0.04

Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck	1.217x10^19 GeV	
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

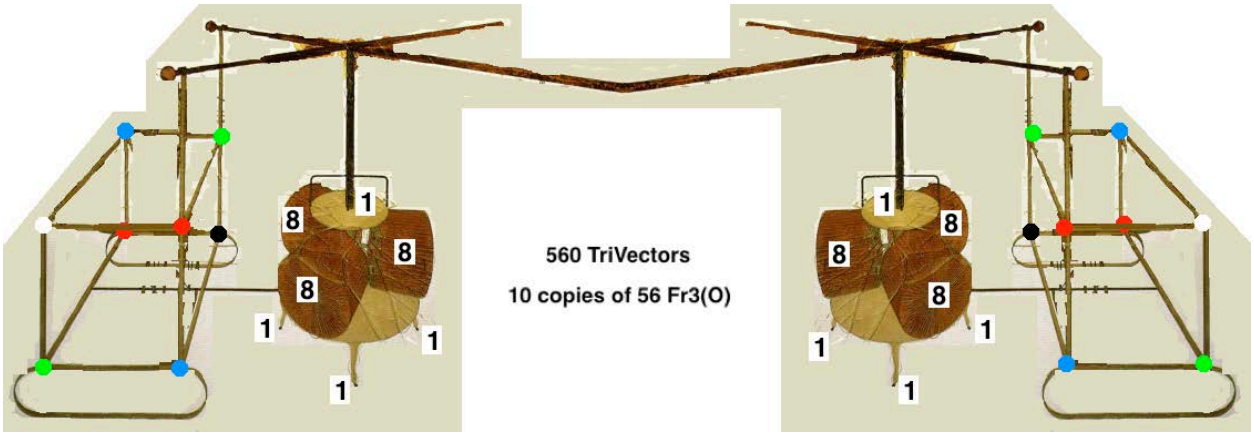
Kobayashi-Maskawa parameters for W+ and W- processes are:

	d	s	b
u	0.975	0.222	0.00249 -0.00388i
c	-0.222 -0.000161i	0.974 -0.0000365i	0.0423
t	0.00698 -0.00378i	-0.0418 -0.00086i	0.999

The phase angle d13 is taken to be 1 radian.

Cl(16) 560 TriVectors = 10 copies of 56-dim Fr3(O)

The Large Glass + Mirror connects World-Line Strings
with the volumes of M4 and CP2 parts of Spacetime and
with the Fr3(O) = 1+8+8+8+1+1+1 + 1+8+8+8+1+1+1 TriVectors of Cl(16)
where 56-dim Freudenthal Algeba Fr3(O) = Complexification of 27-dim J3(O)
whose 26-dim traceless part J3(O)o is the structure of 26D String Theory.



16 Fermions (8 Particles + 8 AntiParticles) are at Vertices of the Gliders
whose Runners represent Spin-2 Bohmion carriers of Bohm Quantum Potential.
The 10 copies of Fr3(O) are one for each dimension of the 26-16 = 8+2 =
= 10 dimensions of String=World-Line Theory spacetime.
The multiple copies are necessary because there are 8 types of E8 Lattice
7 of which are algebraically independent Integral Domains with the fundamental
spacetime Lattice being a superposition of E8 Lattices.

Each cell of the spacetime Lattice has Cl(16) structure.
Cl(16) has 16 Vectors, 120 BiVectors, 128 half-Spinors, 560 TriVectors,
and 65,536-16-120-128-560 = 64,712 elements of Cl(16) that are available to carry
information in Quantum Consciousness processes.

Strings = World-Lines of Particles in the M4 and CP2 parts of Spacetime

interact by entire fine-grained histories. Andrew Gray (quant-ph/9712037v2) said:
"... A new formulation of quantum mechanics ... assign[s] ... probabilities ...
to entire fine-grained histories ... [It] is fully relativistic and applicable to multi-particle
systems ...[and]... makes the same experimental predictions as quantum field theory ...
consider space and time cut up into small volume elements
... and then take the limit as ... volume ... ---> 0 ...
get the final amplitude ... by considering all possible distributions at a time t earlier ...

for each such distribution the amplitude for it to occur [is] multiplied by the amplitude to get ... the final distribution ... the interference factor ... is a measure of how much interference between the different possible histories that contain the distribution of interest there is at each time ... This result is the ...
Feynman amplitude squared times the product of all the interference factors ...".

Luis E. Ibanez and Angel M. Uranga in "String Theory and Particle Physics" said:
"... String theory proposes ... small one-dimensional extended objects, strings, of typical size Ls = 1/ Ms, with Ms known as the string scale ...
As a string evolves in time, it sweeps out a two-dimensional surface in spacetime, known as the worldsheet, which is the analog of the ... worldline of a point particle ... for the bosonic string theory ... the classical string action is the total area spanned by the worldsheet ... This is the ... Nambu– Goto action ...".
Consider the Gray Fine-Grained History to be a World-Line String.

The Gray Fine-Grained History Quantum Theory is equivalent to the Nambu-Goto action of 26D String Theory.
Nambu-Goto 24x24 traceless spin-2 particle
is
Quantum Bohmion carrier of Bohm Quantum Potential

Further, Ibanez and Uranga also said:
"... The string groundstate corresponds to a 26d spacetime tachyonic scalar field T(x).
This **tachyon** ... is ... unstable ...
The massless two-index tensor splits into irreducible representations of SO(24) ...
Its trace corresponds to a scalar field, the **dilaton ϕ**, whose vev fixes the string interaction coupling constant gs ...
the **antisymmetric part** is the 26d 2-form field BMN
...
The **symmetric traceless part** is the 26d ... GMN ...".

Closed string tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions.
Dilatons are Goldstone bosons of spontaneously broken scale invariance that (analagous to Higgs) go from mediating a long-range scalar gravity-type force to the nonlocality of the Bohm-Sarfatti Quantum Potential.
The antisymmetric SO(24) little group is related to the Monster automorphism group that is the symmetry of each cell of Planck-scale local lattice structure.
The traceless symmetric traceless part is the Quantum Bohmion.

Joe Polchinski in “String Theory, Volume 1, An Introduction to the Bosonic String” said:

“... we find at m^2 = - 4 / alpha’ the tachyon,
and at m^2 = 0 the 24 x 24 states of the graviton, dilaton, and antisymmetric tensor ...”.

Must the 24x24 symmetric matrices be interpreted as the graviton ? - !!! NO !!!
The 24x24 Real Symmetric Matrices form the Jordan Algebra J(24,R).
Jordan algebras correspond to the matrix algebra of quantum mechanical states,
that is, from a particle physics point of view,
the configuration of particles in spacetime upon which the gauge groups act.

24-Real-dim space has a natural Octonionic structure of 3-Octonionic-dim space.
The corresponding Jordan Algebra is J(3,O) = 3x3 Hermitian Octonion matrices.
Their 26-dim traceless part J(3,O)o describes the 26-dim of Bosonic String Theory
and
the algebra of its Quantum States,
so that

the 24x24 traceless symmetric spin-2 particle is the Quantum Bohmion.

If Strings = World Lines and World Lines are past and future histories of particles,
then spin-2 string entities carry Bohm Quantum Potential with Sarfatti Back-Reaction related to Cramer Transaction Quantum Theory, so
Sarfatti-Bohm Quantum Potential with Back-Reaction is distinct from the MacDowell-Mansouri Gravity of stars and planets.

Similarity of the spin 2 Bohmion to the spin 2 Graviton accounts for
the Bohmion’s ability to support Penrose Consciousness
with Superposition Separation Energy Difference G m^2 / a
where,
for a Human Brain, m = mass of electron and a = 1 nanometer in Tubulin Dimer

“... **Bohm’s Quantum Potential can be viewed as**
an internal energy of a quantum system ...”
according to Dennis, de Gosson, and Hiley (arXiv 1412.5133)

and

Bohm Quantum Potential inherits Sarfatti Back-Reaction
from its spin-2 structure similar to General Relativity

Peter R. Holland says in "The Quantum Theory of Motion" (Cambridge 1993):

"... the total force ... from the quantum potential ... does not ... fall off with distance ... because ... the quantum potential ... depends on the form of ...[the quantum state]... rather than ... its ... magnitude ...".

Penrose-Hameroff-type Quantum Consciousness is due to Resonant Quantum Potential Connections among Quantum State Forms.

The Quantum State Form of a Conscious Brain is determined by the configuration of a subset of its 10^18 to 10^19 Tubulin Dimers described by a large Real Clifford Algebra.

Paola Zizzi in gr-qc/0007006 describes the Octonionic Inflation Era of Our Universe as a Quantum Consciousness Superpositon of States ending with Self-Decoherence after 64 doublings of Octonionic Inflation, at which time Our Universe is

"... a superposed state of quantum ... [qubits].
the self-reduction of the superposed quantum state is ... reached at the end of inflation ...[at]... the decoherence time ... [Tdecoh = 10^9 Tplanck = 10^(-34) sec] ... and corresponds to a superposed state of ... [10^19 = 2^64 qubits]. ...".

64 doublings to 2^64 qubits corresponds to the Clifford algebra
Cl(64) = Cl(8x8) = Cl(8) x Cl(8) x Cl(8) x Cl(8) x Cl(8) x Cl(8) x Cl(8) x Cl(8)
By the periodicity-8 theorem of Real Clifford algebras, Cl(64) is the smallest Real Clifford algebra for which we can reflexively identify each component Cl(8) with a basis vector in the Cl(8) vector space.
This reflexive identification causes our universe to decohere at N = 2^64 = 10^19.

Octonionic Quantum Processes are Not Unitary and so can produce Fermions.
(see Stephen Adler's book "Quaternionic Quantum Mechanics ..." at pages 50-52 and 561).
At the end of 64 Unfoldings, Non-Unitary Octonionic Inflation ended having produced about (1/2) 16^64 = (1/2) (2^4)^64 = 2^255 = 6 x 10^76 Fermions.
At the End of Inflation Our Universe had Temperature / Energy 10^27 K = 10^14 GeV so each of the 10^77 Fermions had energy of 10^14 GeV and collisions among them would for each of the 10^77 Fermions produce jets containing about 10^12 particles of energy 100 GeV or so so that the total number created by Inflation was about 10^89.

The End of Inflation time was at about 10^(-34) sec = 2^64 Tplanck
and
the size of our Universe was then about 10^(-24) cm
which is about the size of a Fermion Schwinger Source Kerr-Newman Cloud.

The 2^64 qubits created by Inflation is roughly 10^19 which is roughly the number of Quantum Consciousness Tubulins in the Human Brain.
Therefore

the Human Brain Quantum Consciousness has evolved in Our Universe to be roughly equivalent to the Maximum Consciousness of Our Inflationary Era Universe.

Further,

each cell of E8 Lagrangian Spacetime corresponds to 65,536-dim Cl(16)
which contains 248-dim E8 = 120-dim D8 bivectors +128-dim D8 half-spinors
and
Human Brain Microtubules 40 microns long have 65,536 Tubulin Dimers

(image adapted from 12biophys.blogspot.com Lecture 11)

So

Brain Microtubules can have Bohm Quantum Resonance with Cl(16) Spacetime cells
and at any and all Times
the State of Consciousness of a Human is in exact resonant correspondence with
a subset of the cells of E8 Classical Lagrangian Spacetime

Therefore

E8 Lagrangian Spacetime (as a Nambu-Jona-Lasinio Condensate)
is effectively the Spirit World
in which the Human States of Consciousness = Souls exist.

After the death of the Human Physical Body the Spirit World interactions with its Soul
are no longer constrained by Physical World interactions with its Body
so
the Spirit World can harmonize the individual Soul
with the collective Universal Soul.

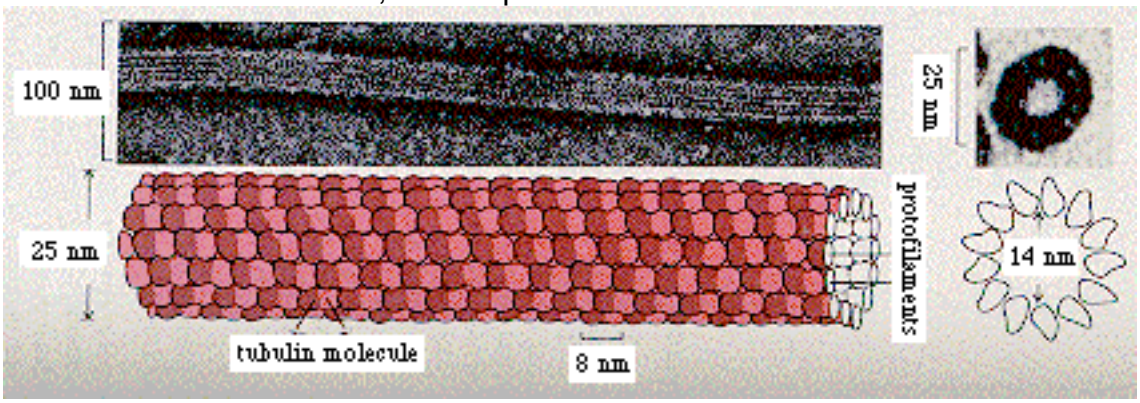
A Single Cell of E8 26-dimensional Bosonic String Theory,
in which Strings are physically interpreted as World-Lines,
can be described by taking the quotient of its 24-dimensional O+, O-, Ov
subspace modulo the 24-dimensional Leech lattice.
Its automorphism group is the largest finite sporadic group, the Monster Group,
whose order is
8080, 17424, 79451, 28758, 86459, 90496, 17107, 57005, 75436, 80000, 00000 =
= 2^46 .3^20 .5^9 .7^6 .11^2 .13^3 .17.19.23.29.31.41.47.59.71
or about 8 x 10^53.

For the 10^18 Tubulin Dimers of the human brain,
the resonant frequencies are the same and exchanges of energy among them
act to keep them locked in a Quantum Protectorate collective coherent state.

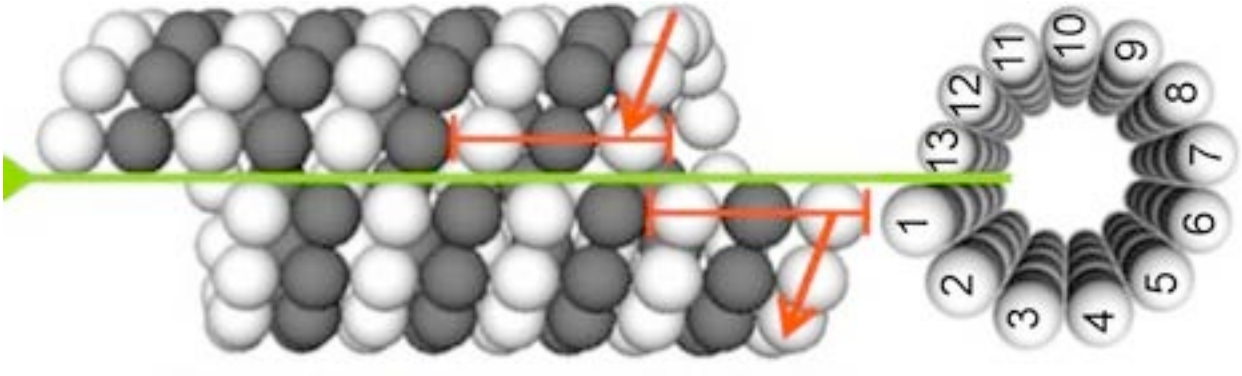
Mershin, Sanabria, Miller, Nawarathna, Skoulakis, Mavromatos, Kolomenskii, Scheussler, Ludena, and Nanopoulos in physics/0505080 “Towards Experimental Tests of Quantum Effects in Cytoskeletal Proteins” said:

Classically, the various dimers can only be in the ...[]... conformations. Each dimer is influenced by the neighboring dimers resulting in the possibility of a transition. This is the basis for classical information processing, which constitutes the picture of a (classical) cellular automaton.
If we assume ... that each dimer can find itself in a QM superposition of ...[those]... states, a quantum system results. Tubulin can then be viewed as a typical two-state quantum mechanical system, where the dimers couple to conformational changes with 10^(-9) - 10^(-11) sec transitions, corresponding to an angular frequency ~ 10^10 - 10^12 Hz. In this approximation, the upper bound of this frequency range is assumed to represent (in order of magnitude) the characteristic frequency of the dimers, viewed as a two-state quantum-mechanical system ...[
The Energy Gap of our Universe as superconductor condensate spacetime is from 3 x 10^(-18) Hz (radius of universe) to 3 x 10^43 Hz (Planck length). Its RMS amplitude is 10^13 Hz = 10 THz = energy of neutrino masses = critical temperature Tc of BSCCO superconducting crystal Josephson Junctions]... large-scale quantum coherence ...[has been observed]... at temperatures within a factor of three of biological temperatures. MRI magnets contain hundreds of miles of superconducting wire and routinely carry a persistent current. There is no distance limit - the macroscopic wave function of the superfluid condensate of electron pairs, or Cooper pairs, in a sufficiently long cable could maintain its quantum phase coherence for many thousands of miles ... there is no limit to the total mass of the electrons participating in the superfluid state. The condensate is “protected” from thermal fluctuations by the BCS energy gap at the Fermi surface ... The term “quantum protectorate” ... describe[s] this and related many-body systems ...”.

Each Microtubule is a hollow cylindrical tube with about 25 nm outside diameter and 14 nm inside diameter, made up of 13 columns of Tubulin Dimers



(illustrations and information about cells, microtubules, and centrioles are from Molecular Biology of the Cell, 2nd ed, by Alberts, Bray, Lewis, Raff, Roberts, and Watson (Garland 1989))



(image from Wikipedia on Microtubule)

Each Tubulin Dimer is about 8 nm x 4 nm x 4 nm, consists of two parts, alpha-tubulin and beta-tubulin (each made up of about 450 Amino Acids, each containing roughly 20 Atoms)

A Microtubule 40 microns = 40,000 nm long contains 13 x 40,000 / 8 = 65,000 Dimers

(images adapted from nonlocal.com/hbar/microtubules.html by Rhett Savage)

The black dots indicate the position of the Conformation Electrons.

There are two energetically distinct configurations for the Tubulin Dimers:

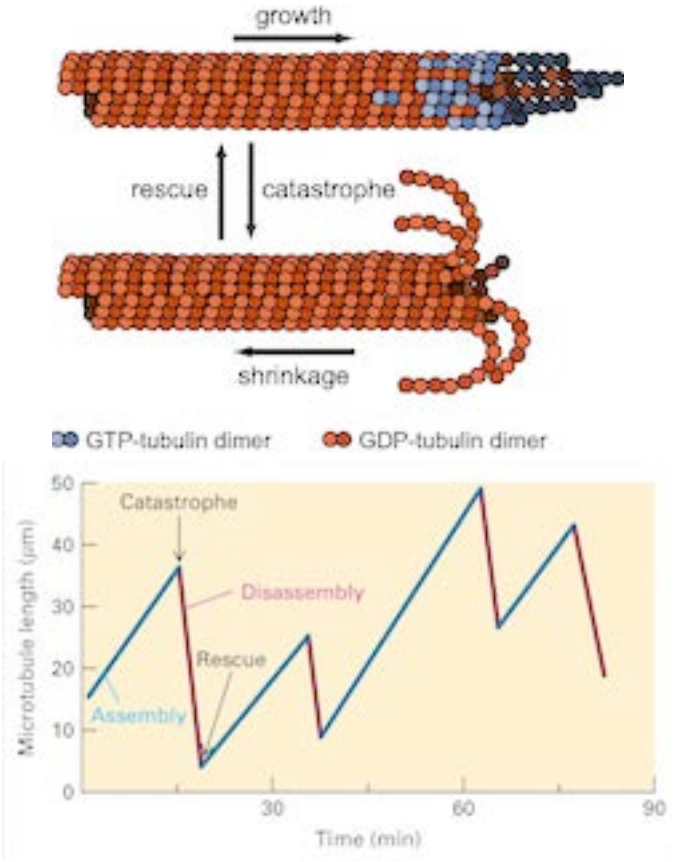
Conformation Electrons Similarly Aligned (left image) - State 0

Conformation Electrons Maximally Separated (right image) - State 1

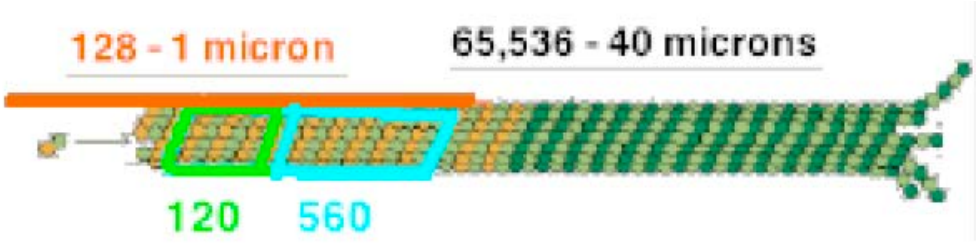
The two structures - State 0 ground state and State 1 higher energy state - make Tubulin Dimers the basis for a Microtubule binary math / code system corresponding to Clifford Algebras Cl(8) and Cl(8)xCl(8) = Cl(16) .

According to 12biophys.blogspot.com Lecture 11 Microtubule structure is dynamic:
"... One end of the microtubule is composed of stable (GTP) monomers
while the rest of the tubule is made up of unstable (GDP) monomers.
The GTP end comprises a cap of stable monomers.
Random fluctuations either increase or decrease the size of the cap.

This results in 2 different dynamic states for the microtubule.
Growing: cap is present Shrinking: cap is gone ...
...".



Microtubules spend most of their lives between 10 microns and 40 microns.
The full 40 micron size 65,000 dimers corresponds to 65,536-dim Cl(16) = Cl(8)xCl(8) .
The 128 Cl(8) Half-Spinor part ▬▬▬▬▬ is represented
by a line of 128 Dimers in its stable GTP region and
the 120 Cl(16) BiVector part by a 12 x 10 block of Dimers in its stable GTP region
The 16 Cl(16) Vector and 560 Cl(16) TriVector parts are represented similarly.
(image adapted from 12biophys.blogspot.com Lecture 11)



Now consider the case of N Tubulin Dimers in Coherent Superposition
connected by the Bohm Quantum Potential Force that does not fall off with distance.

Jack Sarfatti defines coherence length L by L^3 = N a^3 so that
the Superposition Energy E_N of N superposed Conformation Electrons is

$$E_N = G M^2 / L = N^{(5/3)} E_{ssediff}$$

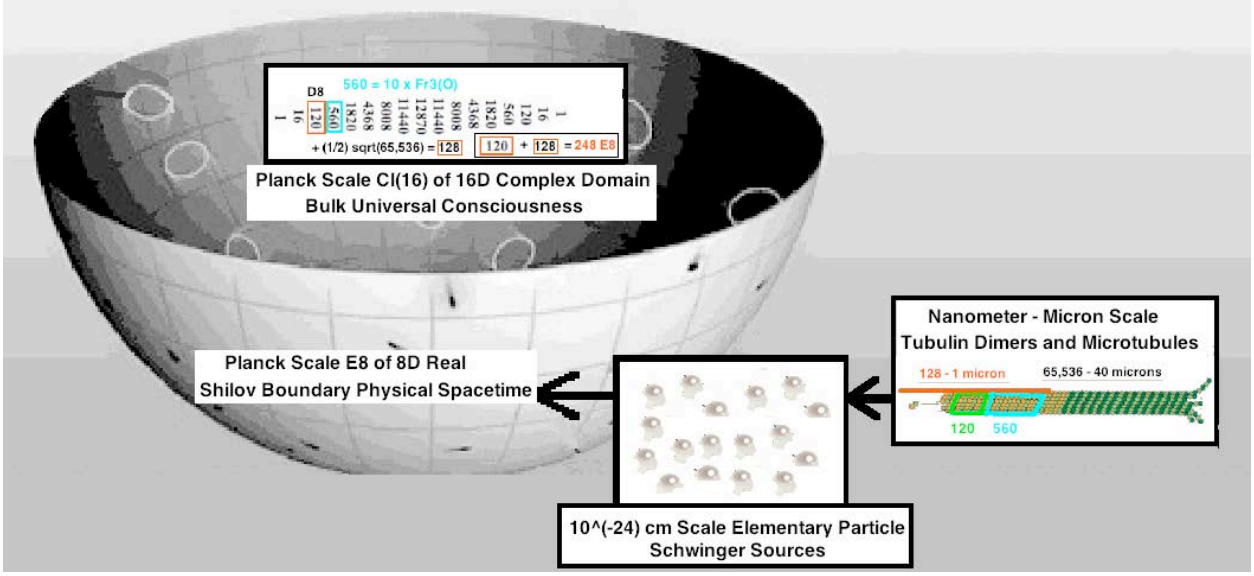
The decoherence time for the system of N Tubulin Electrons is

$$T_N = h / E_N = h / N^{(5/3)} E_{ssediff} = N^{(-5/3)} 10^{26} \text{ sec}$$

so we have the following rough approximate Decoherence Times T_N

Number of Involved Tubulin Dimers	Time T_N
10^(11+9) = 10^20 10^11 neurons x 10^9 TD / neuron = = 10^20 Tubuin Dimers in Human Brain	10^(-33 + 26) = 10^(-7) sec
10^16 TD in common thought	10^(-27 + 26) = 10^(-1) sec - 10 Hz Human Alpha EEG is 8 to 13 Hz Fundamental Schumann Resonance is 7.8 Hz Time of Traverse by a String World-Line Quantum Bohmion of a Quantum Consciousness Hamiltonian Circuit of 10^16 TD separated from nearest neighbors by 10 nm is 10^16 x 10 nm / c = (10^16 x 10^(-6)) cm / c = = 10^10 cm / c = 0.3 sec

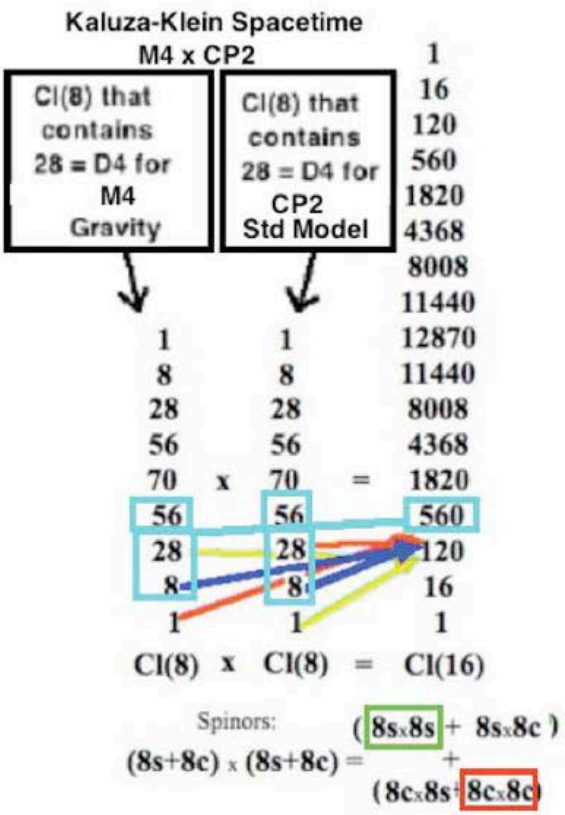
Each cell of E8 Classical Lagrangian Spacetime corresponds to 65,536-dim Cl(16)
which contains 248-dim E8 = 120-dim D8 bivectors +128-dim D8 half-spinors

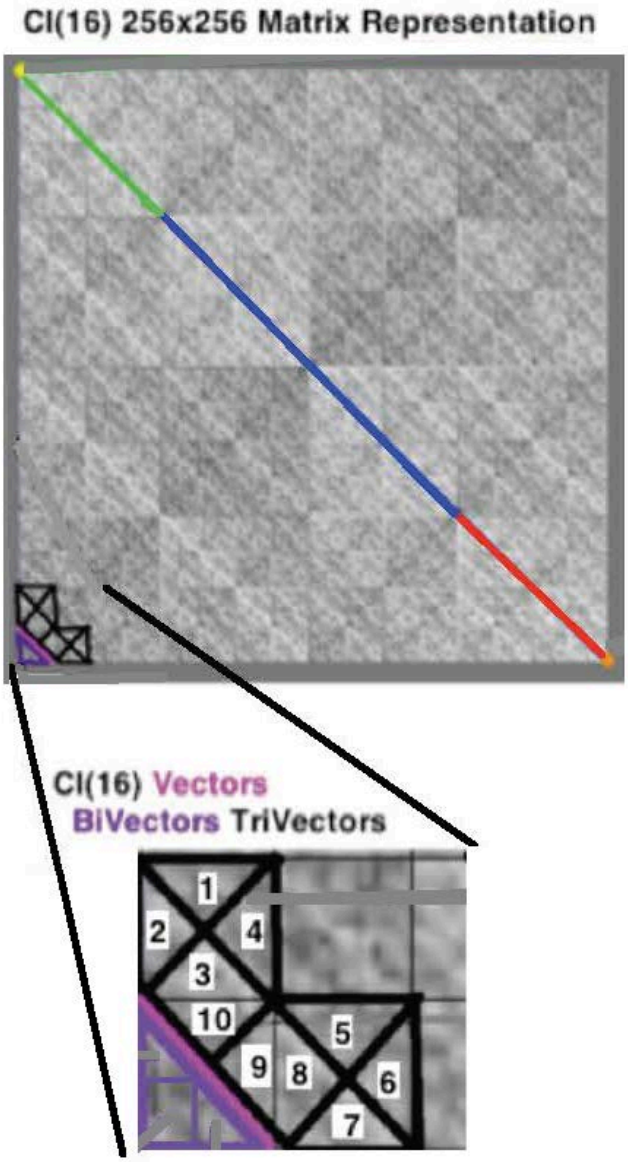


In E8 Physics (viXra 1602.0319)
Spacetime is the 8-dimensional Shilov Boundary RP1 x S7
of the Type IV8 Bounded Complex Domain Bulk Space
of the Symmetric Space Spin(10) / Spin(8)xU(1)
which Bulk Space has 16 Real dimensions
and is the Vector Space of the Real Clifford Algebra Cl(16).
By 8-Periodicity,
Cl(16) = tensor product Cl(8) x Cl(8) = Real 256x256 Matrix Algebra M(R,256)
and so has 256x256 = 65,536 elements.

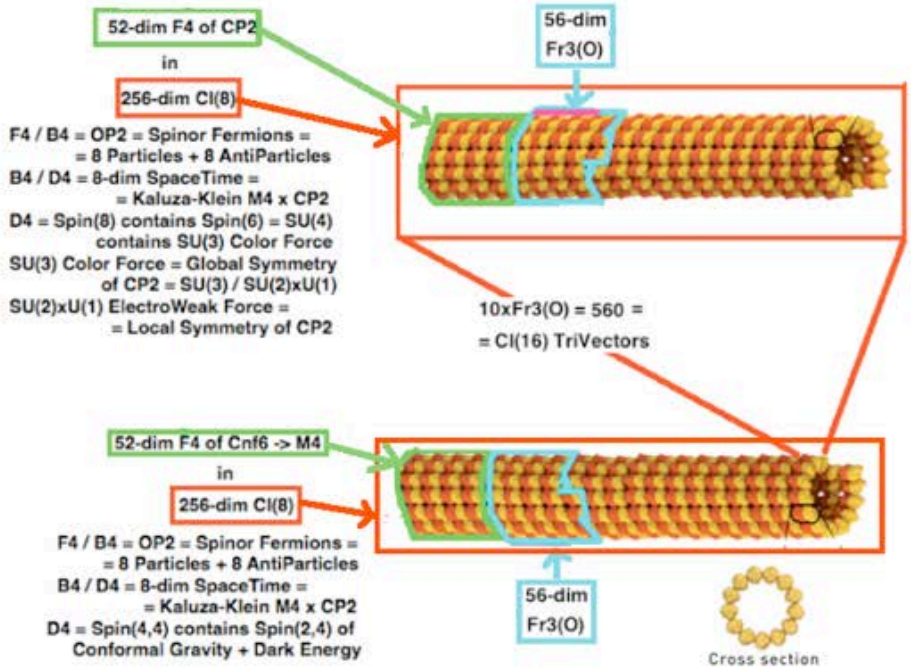
Cl(8) has 8 Vectors, 28 BiVectors, and 16 Spinors with 8+28+16 = 52 = F4 Lie Algebra.
Cl(16) has 120 BiVectors and 128 Half-Spinors for 120+128 = 248 = E8 Lie Algebra
giving a Lagrangian for the Standard Model and for Gravity - Dark Energy.
Cl(16) has 560 TriVectors for 10 copies of Fr3(O) and Cl(1,25) AQFT
so 65,536 - 248 - 560 = 64,728 elements of Cl(16) are for Consciousness Information.
The Complex Bulk Space Cl(16)
contains the Maximal Contraction of E8 which is H92 + A7
a generalized Heisenberg Algebra of Quantum Creation-Annihilation Operators with
graded structure

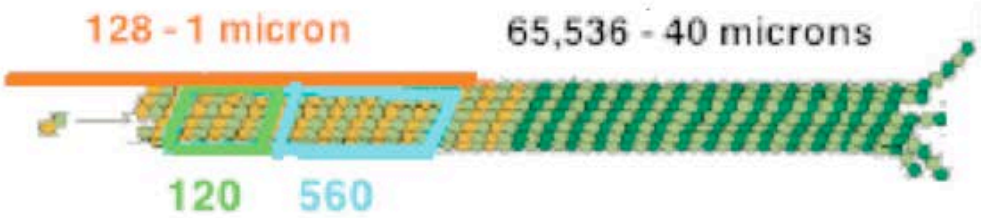
$$28 + 64 + ((SL(8,R)+1) + 64 + 28$$


Kaluza-Klein Spacetime
M4 x CP2
Cl(8) that contains 28 = D4 for M4 Gravity
Cl(8) that contains 28 = D4 for CP2 Std Model
1 1 1
8 8 16
28 28 120
56 56 560
70 x 70 = 1820
56 56 560
28 28 120
8 8 16
1 1 1
Cl(8) x Cl(8) = Cl(16)
Spinors:
(8s+8c) x (8s+8c) = (8sx8s + 8sx8c) + (8cx8s + 8cx8c)

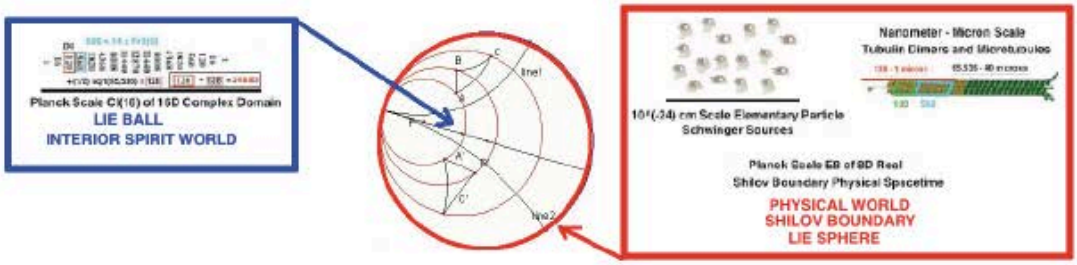

Cl(16) 256x256 Matrix Representation
Cl(16) Vectors
BiVectors TriVectors
1
2
4
3
10
5
9
8
6
7

Physical Body contains Information





Human Brain Microtubules 40 microns = 65,536 Tubulin Dimers
each Human Microtubule with 65,536 Tubulin Dimers
can have a Bohm Quantum Resonant Connection with
a Spirit World Unit Lattice Cell with 65,536-element Cl(16) Structure



The Earthly World is the 8-real-dim Lie Sphere Shilov Boundary RP1 x S7

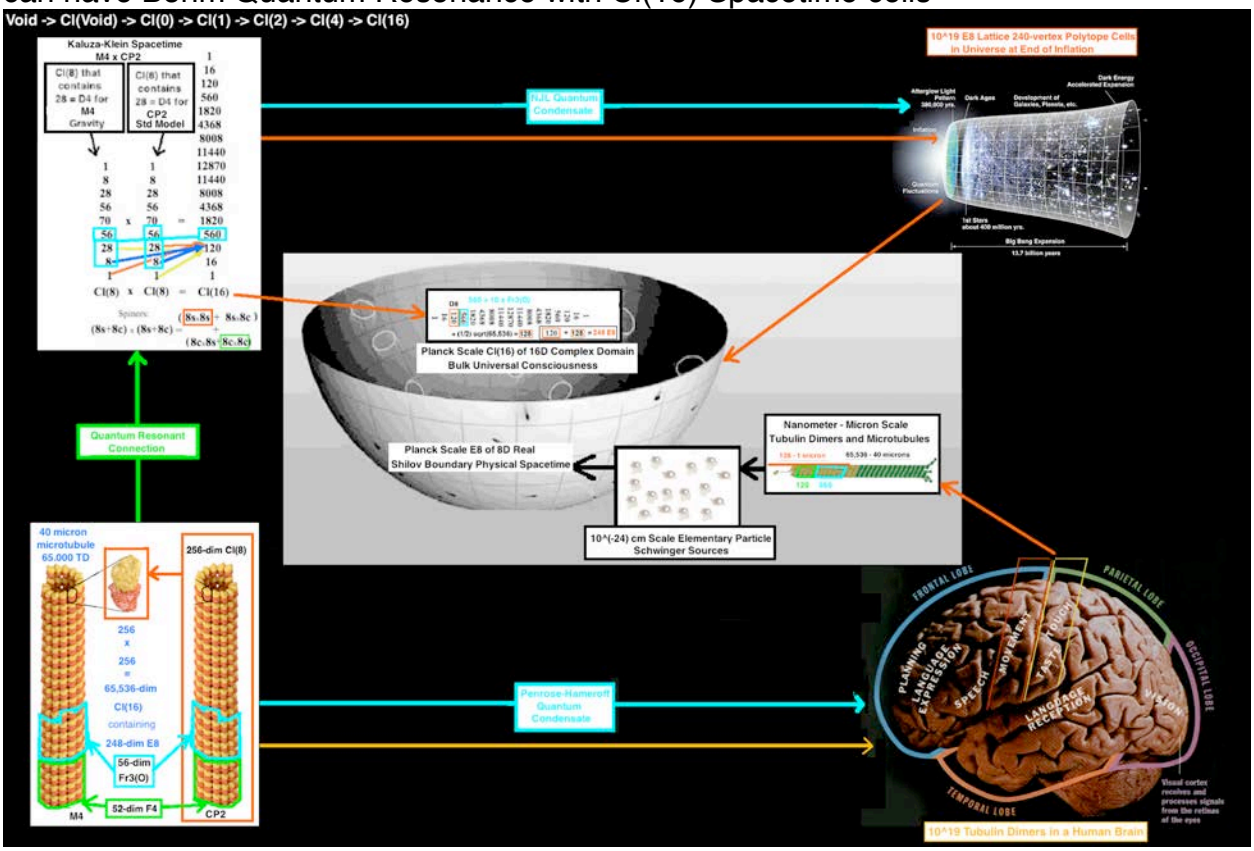
The Spirit World is the interior of that Shilov Boundary
which is the Type IV(8) Bounded Complex Domain
corresponding to the Lie Ball Symmetric Space D5 / D4 x U(1)

Human Brain Microtubules 40 microns long have 65,536 Tubulin Dimers

(image adapted from 12biophys.blogspot.com Lecture 11)

and so

can have Bohm Quantum Resonance with Cl(16) Spacetime cells



so that at any and all Times

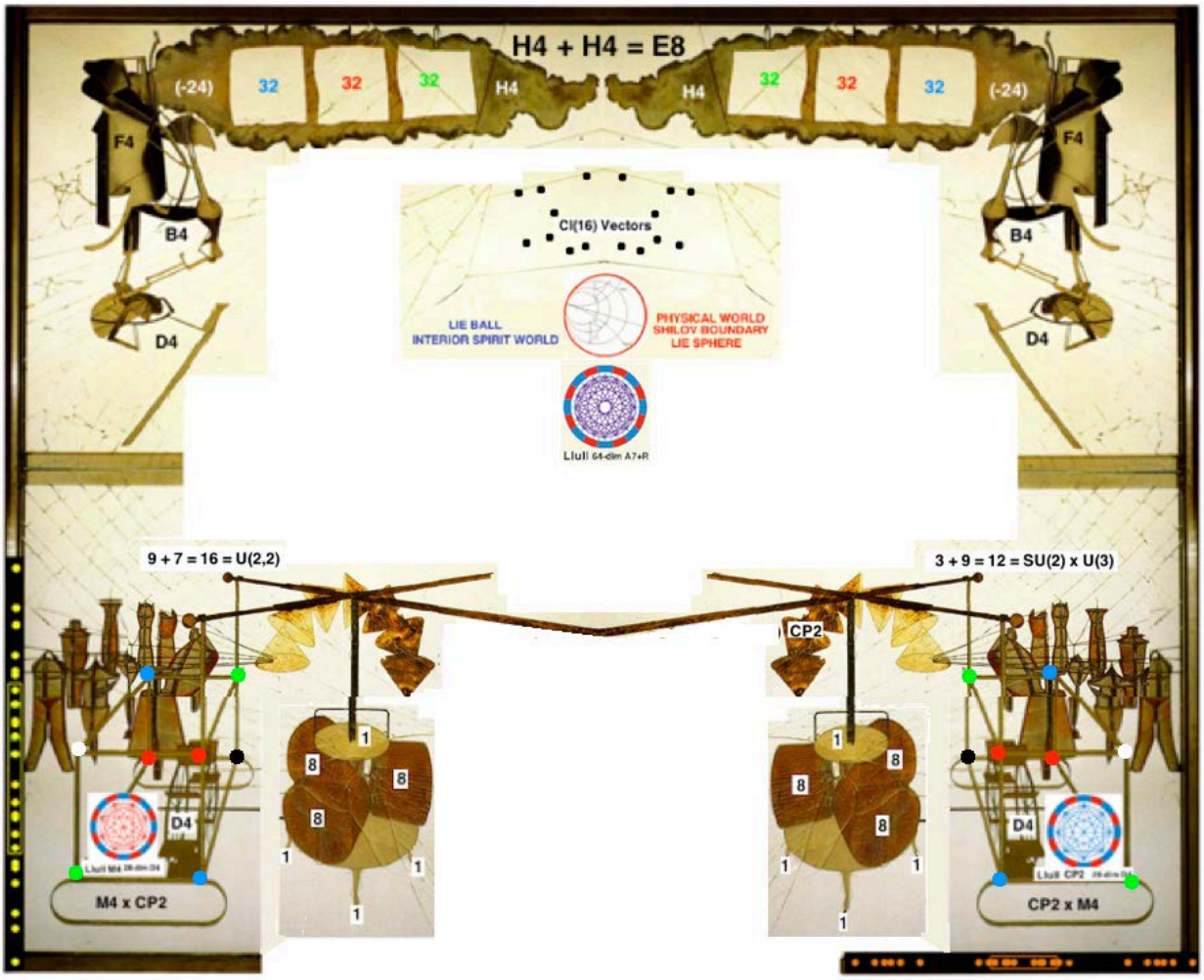
the State of Consciousness of a Human is in exact resonant correspondence with a subset of the cells of E8 Classical Lagrangian Spacetime.

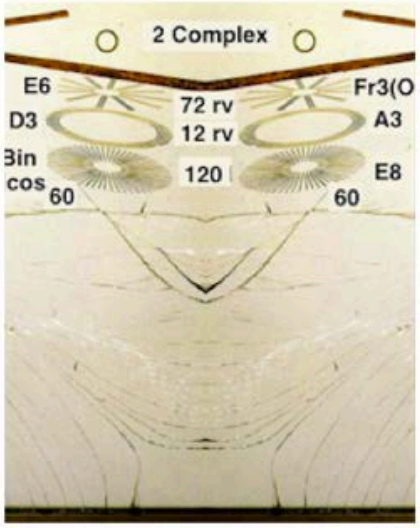
Therefore

E8 Classical Lagrangian Spacetime NJL Condensate is effectively the Spirit World in which the Human States of Consciousness = Souls exist. After the death of the Human Physical Body the Spirit World interactions with its Soul are no longer constrained by Physical World interactions with its Body so that the Spirit World can harmonize the individual Soul with the collective Universal Soul. **William KIngdon Clifford, who invented Real Clifford Algebras, called them "mind-stuff", saying: "...**

When matter takes the complex form of a living human brain,
the corresponding mind-stuff takes the form of a human consciousness ...".

Smiling Spirit Being





To me the Lower Central part of the Large Glass + MIrror looks like a Smiling Spirit Being with 4 pairs of circular eyes. The eyes (and eyebrow type Strings= World-Lines) are the work of Marcel Duchamp but the rest of the Smiling Spirit Being image is formed by cracks in the Glass from it being accidentally dropped by movers in Brooklyn in 1927. Therefore you might say that the Smiling Spirit Being was a product of the Spirit World, if Spirits can influence accidents.

If the 4 pairs of eyes represent 4 thoughts in the Mind of the Smiling Spirit Being, they would be

Cl(16) Vectors:
1+1 = 2-dim Complex Numbers
for Lie Ball
Bounded Complex Domain Spin(10) / Spin(8)xU(1)

Cl(16) TriVectors:
36+36 = 72 rv of E6 automorphism group of 56-dim Fr3(O)
that is Complexification of 27-dim J3(O)
whose traceless part is 26-dim J3(O)o

Cl(16) BiVectors:
6+6 = 12 rv of D3 = A3
D3 contains Conformal Spin(2,4) for Gravity + Dark Energy acting on M4
A3 = SU(4) contains SU3 acting on CP2 = SU(3) / SU(2)xU(1)

Cl(16) BiVectors and half-Spinors:
60+60 = 120 Binary Icosahedral Group
in McKay Correspondence with E8

What did Duchamp think of the Spirit World ?

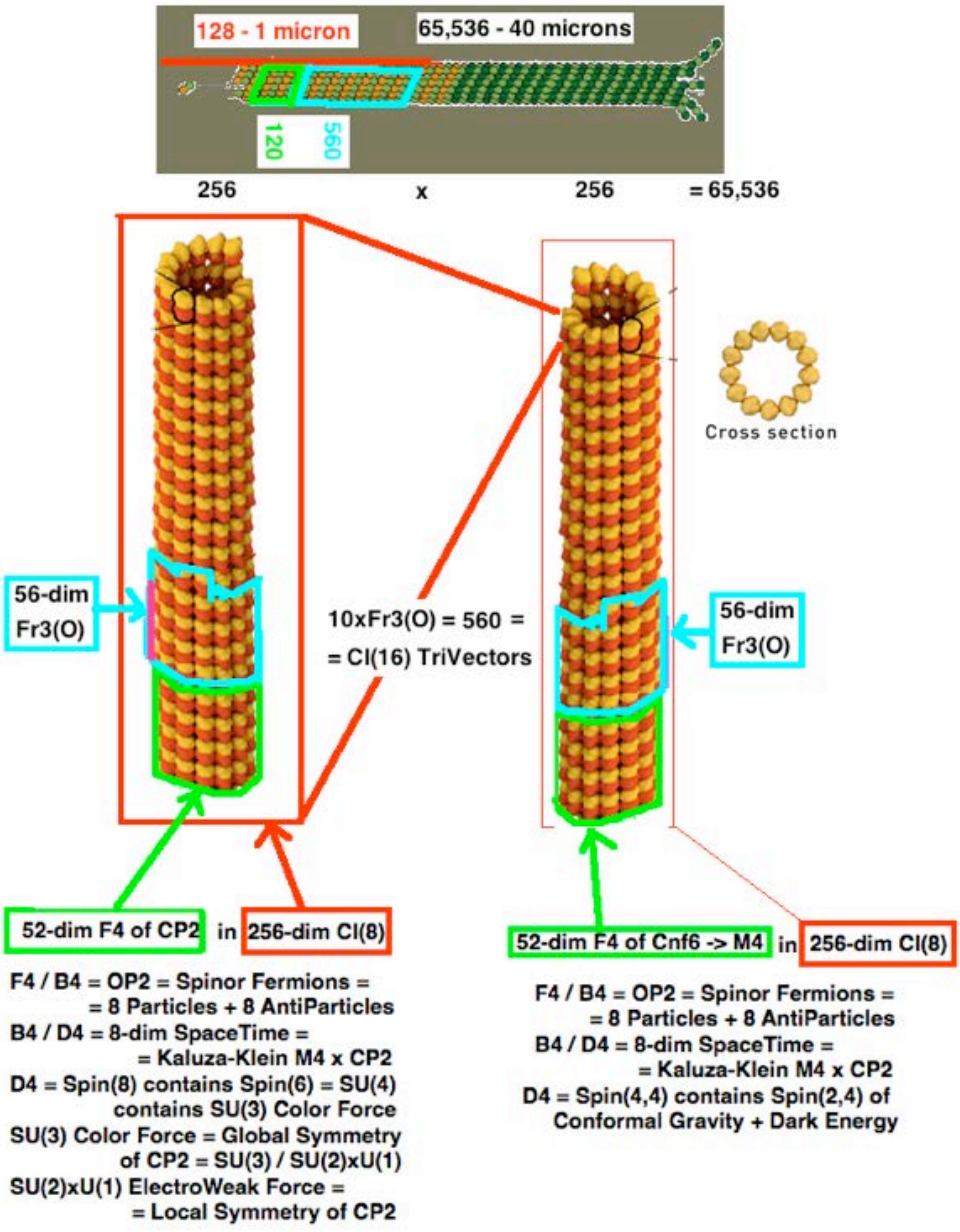
John F. Moffittn in "Alchemist of the Avant-Garde the case of Marcel Duchamp" said:
"... ... the real issue is the correct identification of “Duchamp’s historical, contemporary sources or influences.” ... two widely read “master-key” and “scientific” classics of fin de siècle Occultism ...[were by]... Helena Blavatsky ... and Papus ...
between 1915 and 1923 ... the esoteric activities mutually pursued by Duchamp, Arensberg, and Dreier is what is now known as “New York Dada.” ...
One of Dreier’s favorite Theosophical authors was Rudolf Steiner (1861–1925)...
[Rudolf Steiner studied the **Spirit World and how it relates to the Physical World** (Geisteswissenschaft) in building his Goetheneanum. see viXra 1810.0365]
Steiner proclaimed ... **an Art will arise ... filled with spirit ... transcend[ing] nature**.
Once Nature has been transcended, then, says Steiner

“... large numbers of people will feel spiritual life to be a vital necessity, when spiritual life and practical life are finally brought into direct connection with each other. ...”

Jennie Louise Cain in her 2016 U. MIchigan Ph.D. thesis says:
“... Rudolf Steiner (1861-1925) ... was the founder of Anthroposophy, a philosophy and spiritual movement whose aim ... is to develop supersensible capacaties that enable access to what Steiner described as a spiritual dimension underlying all of life ...
Steiner argues that the loss of original clairvoyant capacities ... of ...
the ancient ... culture ... was necessary for the development of intellectualism ...
“Geisteswissenschaft” ... is the re-awakening of a spiritual awareness ...
Steiner ... regards ...the ancient Egyptians ... as oriented toward connection and interaction with the outer world, and ... the greater astronomical cosmos
...
the age of the Egyptian pyramids [was] the time of development of the “Empfindungsseele” ... the ability to experience the outer world internally ...
The pyramid itself is ... a large, sensing organ (an “Empfindungsorgan”) that picks up the relationship of the earth culture as a whole to the cosmos ...".

Earth culture is based on Human Quantum Consciousness of Microtubules = 40 micron size aggregates of 65,536 Tubulin Dimers.

Assembly of 65,536 tubulins into a 40-micron microtubule can be seen to be analogous to the Real Clifford Algebra Cl(16) = 256 x 256 tensor product Cl(8) x Cl(8) where
one 256-dim Cl8) represents Conformal Gravity+Dark Energy with F4gde
related to the Minkowsi M4 of Kaluza-Klein M4 x CP2
and
the other Cl(8) represents Standard Model U(1) SU(2) SU(3) with F4sm
related to the CP2 = SU(3) / SU(2)xU(1) of Kaluza-Klein M4 x CP2.

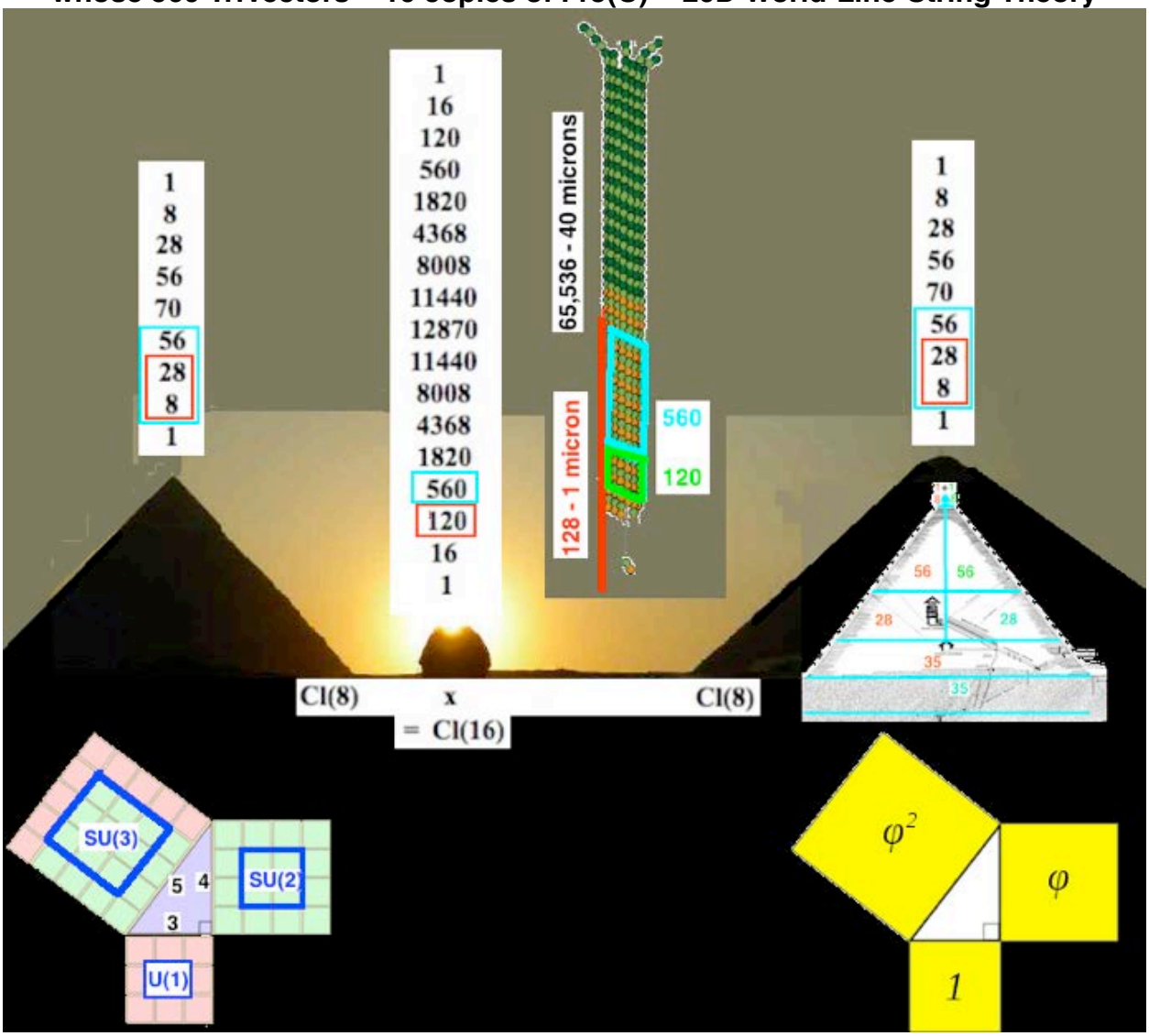


The Earth Culture sees its relationship to the Cosmos
as being reflected in the structures of the Giza Pyramids and Sphinx.

After the victories of Alexander the Great,
his friend, historian, and general Ptolemy Iruled Egypt and its cultural center Alexandria and commissioned Manetho to document history which history included:

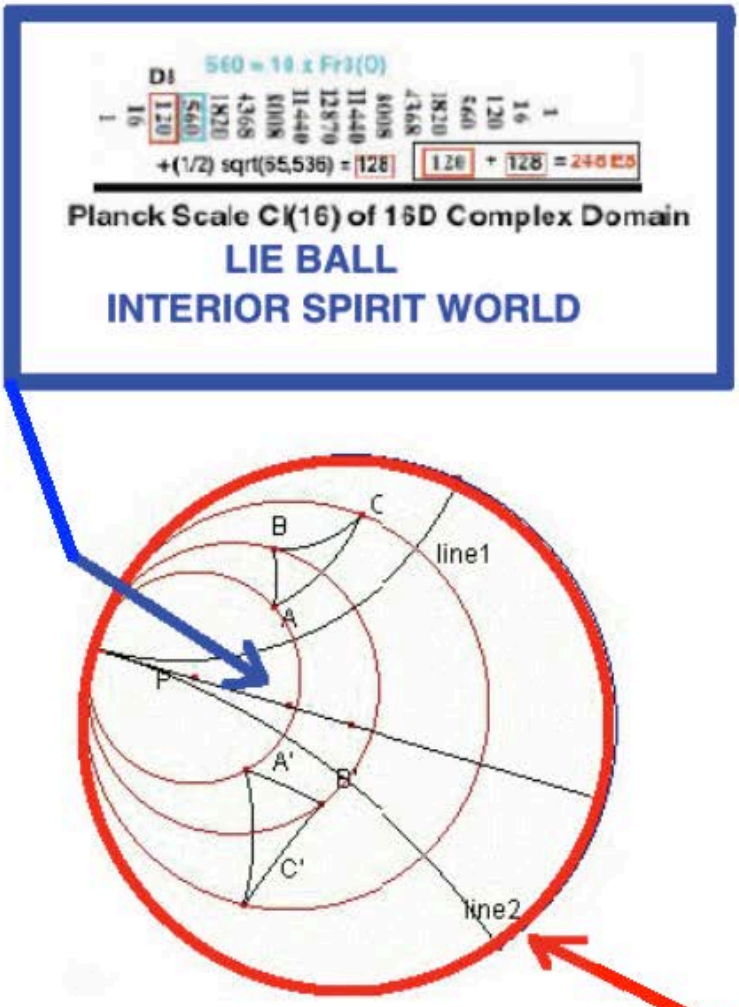
36,525 years ago - North Star Vega -
Humans migrated up the Nile River to Giza
where they built two large Pyramids - each representing Cl(8)

whose 8 Vectors + 28 BiVectors + 16 Spinors = F4 Lie Algebra
one for F4gde = Conformal Gravity + Dark Energy
one for F4sm = Standard Model
and
the Sphinx - representing Cl(16) = Cl(8) x Cl(8)
whose 120 BiVectors + 128 half-Spinors = E8 = Lagrangian
and
whose 560 TriVectors = 10 copies of Fr3(O) = 26D World-Line-String Theory

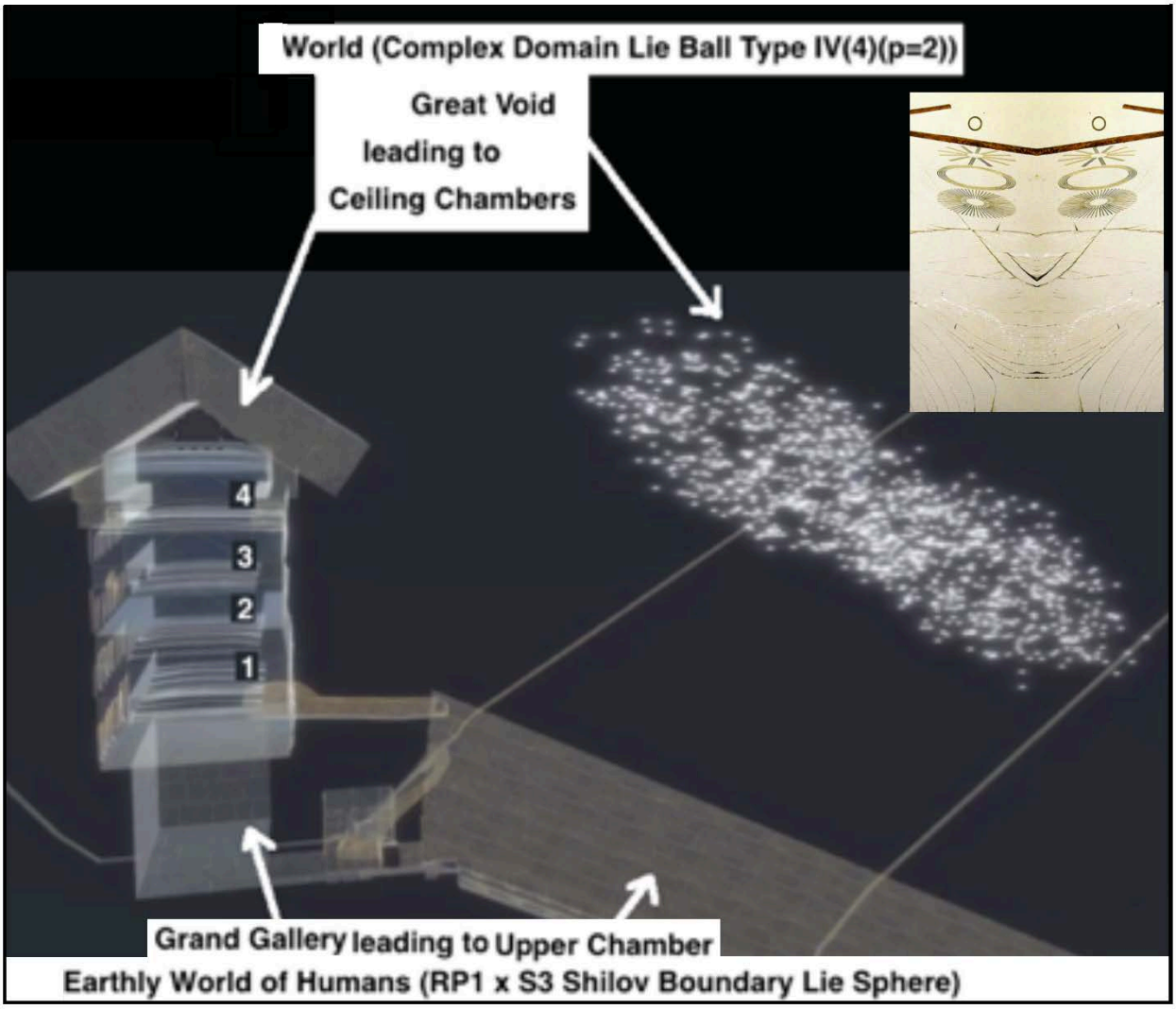


Rudolf Steiner, in Cosmic Memory, said "... The Fourfold Man ... consists of ...
the physical body, the ether ... body, the astral body and the " I " ...".

Physical Body is constructed of 40-micron Microtubules = 65,536 Tubulins
Ether Body is Information coded in the 64,712 Information Tubulins of the Microtubule
Astral Body is 26D World-Line Theory Lattice Cell with 65,536-dim Cl(16) Symmetry
" I " is Information encoded in the 64,712 Information elements per Lattice Cell


560 = 10 x Fr3(0)
DI
+(1/2) sqrt(55,536) = 128
128 + 128 = 256 E8
Planck Scale C(16) of 16D Complex Domain
LIE BALL
INTERIOR SPIRIT WORLD
A
B
C
P
A'
B'
C'
line1
line2
10^(-24) cm Scale Elementary Particle
Schwinger Sources
Nanometer - Micron Scale
Tubulin Dimers and Microtubules
128 - 1 micron
65,536 - 40 microns
120
560
Planck Scale E8 of 8D Real
Shilov Boundary Physical Spacetime
PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE

The Builders of the Great Pyramid represented the Real Shilov Boundary Physical world by the Grand Gallery and Upper Chamber that are easily accessible by Humans with Microtubule Quantum Consciousness
and
they represented the Imaginary Complex World of Cl(16) Spacetime Cells mirroring the Human Microtubule World as Ceiling Chamber spaces and the Great Void that are more accessible to Souls of the Spirit World than to Physical Humans.



The Spirit Being  is made up of glass-break lines from Brooklyn movers accidentally dropping the Large Glass, and so a Spiritual Being of Spiritual Art,
and so also belongs to the Spiritual Realm of Music.

Music and Art - Grosse Fugue and the Large Glass + MIrror

Beethoven's Grosse Fugue (Opus 133 and 134) to me (viXra 1901.0013) is the highest point in Human Music. Stephen Malinowski said "... many think ... Beethoven's late quartets are ... among civilization's crowning achievements ... and the Grosse Fuga arguably the most complex and challenging movement ...".

"... Since ... the 1920s ... the fugue has grown greatly in the eyes of musicians and performers. "**The Great Fugue... now seems to me the most perfect miracle in music**," said Igor Stravinsky "... It is also the most absolutely contemporary piece of music I know, and contemporary forever... Hardly birthmarked by its age, the Great Fugue is, in rhythm alone, more subtle than any music of my own century... I love it beyond everything." Pianist Glenn Gould said, "for me, **the 'Grosse Fuge' is** not only the greatest work Beethoven ever wrote but **just about the most astonishing piece in musical literature**." ...". (from Wikipedia)

My view is that **Duchamp's Large Glass + its Mirror image is to Art what Beethoven's Grosse Fugue is to Music**
and
that both of them are representations of Cl(16) Physics (viXra 1810.0160)

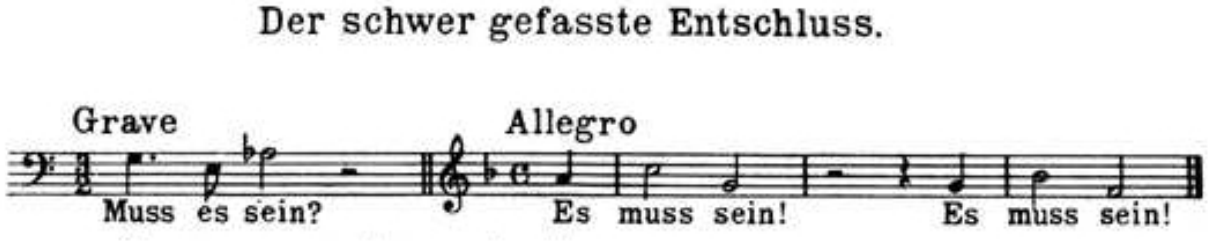
Here is part of the Grosse Fugue (the Overture)
as a representation of Cl(16) Physics:

The Structure of Beethoven's Grosse Fugue (Opus 133 and 134)
(viXra 1901.0013) corresponds to Cl(16) - E8 Physics (viXra 1810.0365) and the evolution of our Universe and Human civilization. Since Beethoven wrote the Grosse Fugue in 1825, two years before his death in 1827, and the E8 Lie Algebra and the Cl(16) Real Clifford Algebra were not known until the work of Lie, Killing, and Clifford in the1870s-1880s, it was not possible for Beethoven to have used the math knowledge of his day in writing the Grosse Fugue. A possible explanation could be that our conscious brains have structure similar to the structure of Cl(16) - E8 so that when Beethoven was composing, looking deep inside his conscious brain to "hear" music mentally that he could not hear normally because of his deafness, he was "seeing" Cl(16) - E8. Human quantum consciousness

is based on microtubules containing maximally about 65,536 Tubulin Dimers. E8 lives in the 65,536-dimensional Real Clifford Algebra Cl(16). Cl(16) is the basic structure of our Universe so Beethoven could have been "seeing" in his mind that the E8 inside Cl(16) looks like part of the structure of microtubules of his consciousness and then writing that structure into the Grosse Fugue.

The Grosse Fugue correpondences with Cl(16) - E8 are shown here using visualizations by Stephen Malinowski.

Beethoven wrote String Quartet Opus 135 in 1826, the year after writing the Grosse Fugue and the year before his death.
Its last movement is headed "Der schwer gefasste Entschluss" ("The Difficult Decision"). In it Beethoven wrote in the manuscript "Muss es sein?" (Must it be?) to which he responds "Es muss sein!" (It must be?). (Wikipedia)



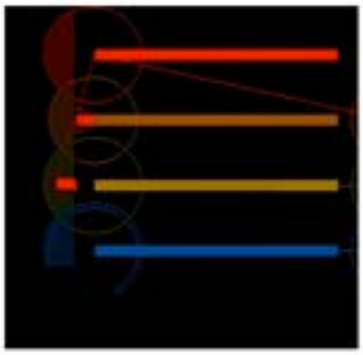
(Elias String Quartet - The Beethoven Project)

My view is that Beethoven sees that the Grosse Fugue has the deep theoretical / historical correlations that I describe in this paper and that he is asking himself to make the Difficult Decision of whether or not those correspondences made it inevitable that he write the Grosse Fugue as he did write it and continue to support it despite the fierce dislike of it expressed by his audience and his publisher. HIs answer "Es muss sein!" is a declaration that the Grosse Fugue
is as important and accurate as to theory and history as I think it is.

Grosse Fugue Overture - Structural Correspondence with Cl(16)

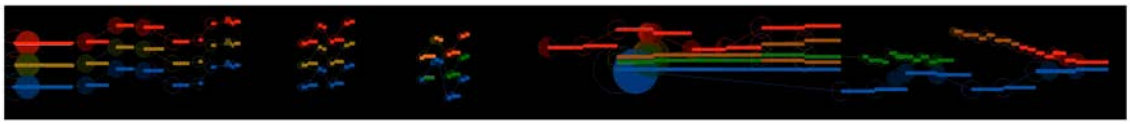
0:04 4 Generators from M4 of Parent Universe -
- Clifford Iteration of M4 = Cl(16) in Our Universe

16-dim Cl(16) Vectors = Lie Ball Bounded Domain
with 8-dim Spacetime Lie Sphere Shilov Boundary



0:08 Overture - Quantum Fluctuation Vacuum Organizes Itself
as Cl(16) containing E8

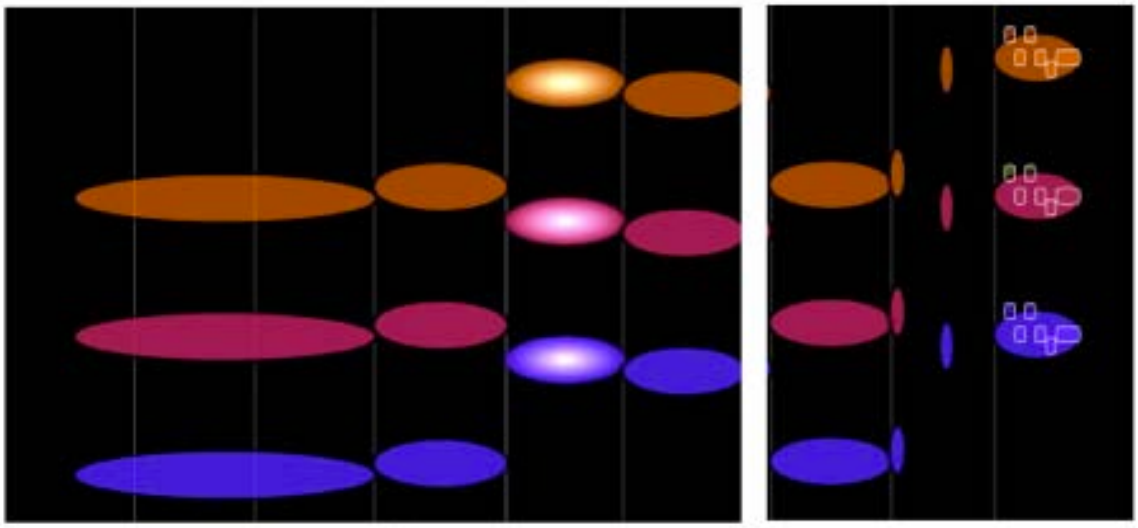
248-dim E8 = 120-dim Cl(16 BiVectors + 128-dim Cl(8) half-Spinors



In more detail:

E8 Lattice 8-dim Spacetime

E8xE8xE8 = 24-dim Leech Lattice of 26D String=World-Line Theory

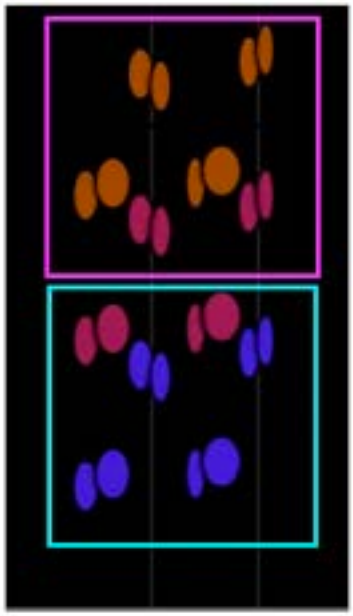


M4 CP2 = SU(3)/U(2)

M4 x CP2 Kaluza-Klein Quaternionic Spacetime

Gravity D4

12 Standard Model Ghosts

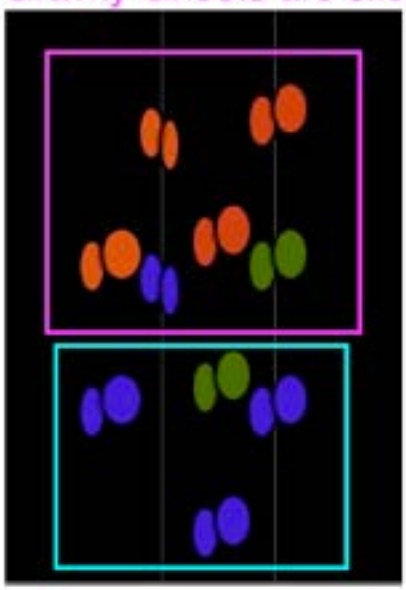


12 SU(2,2) Root Vectors

Standard Model D4

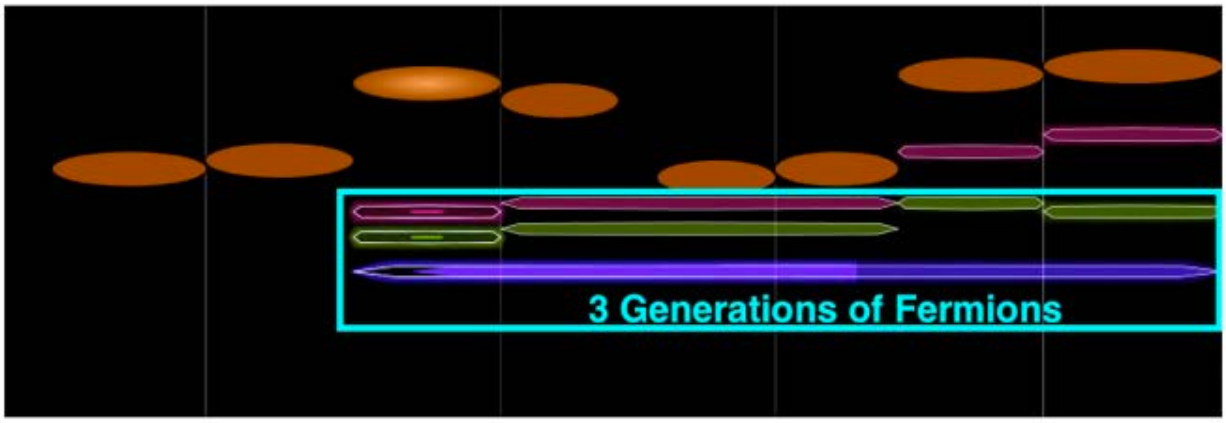
12 of 16 Gravity Ghosts

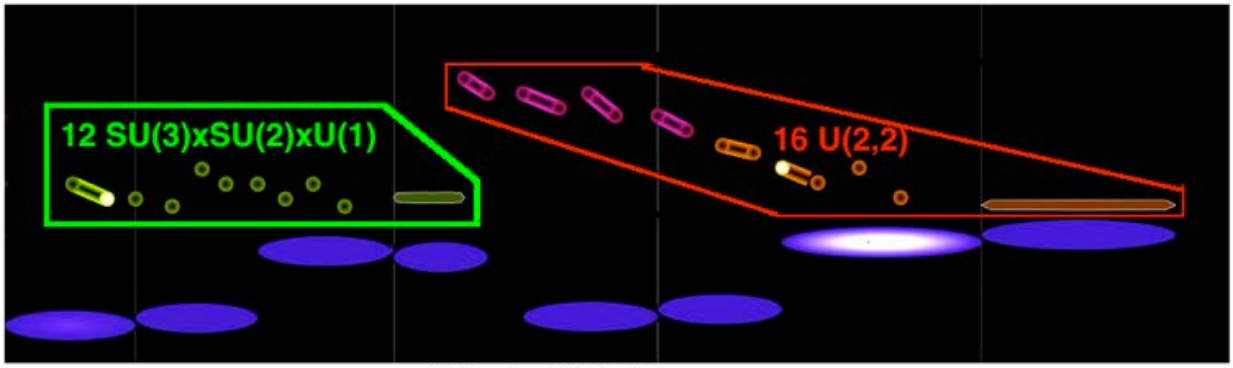
4 Gravity Ghosts are siler



8 Standard Model
Root Vectors

8 Fermion Particles





8 Fermion AntiParticles

For the rest of the Grosse Fugue, see viXra 1901.0013 .